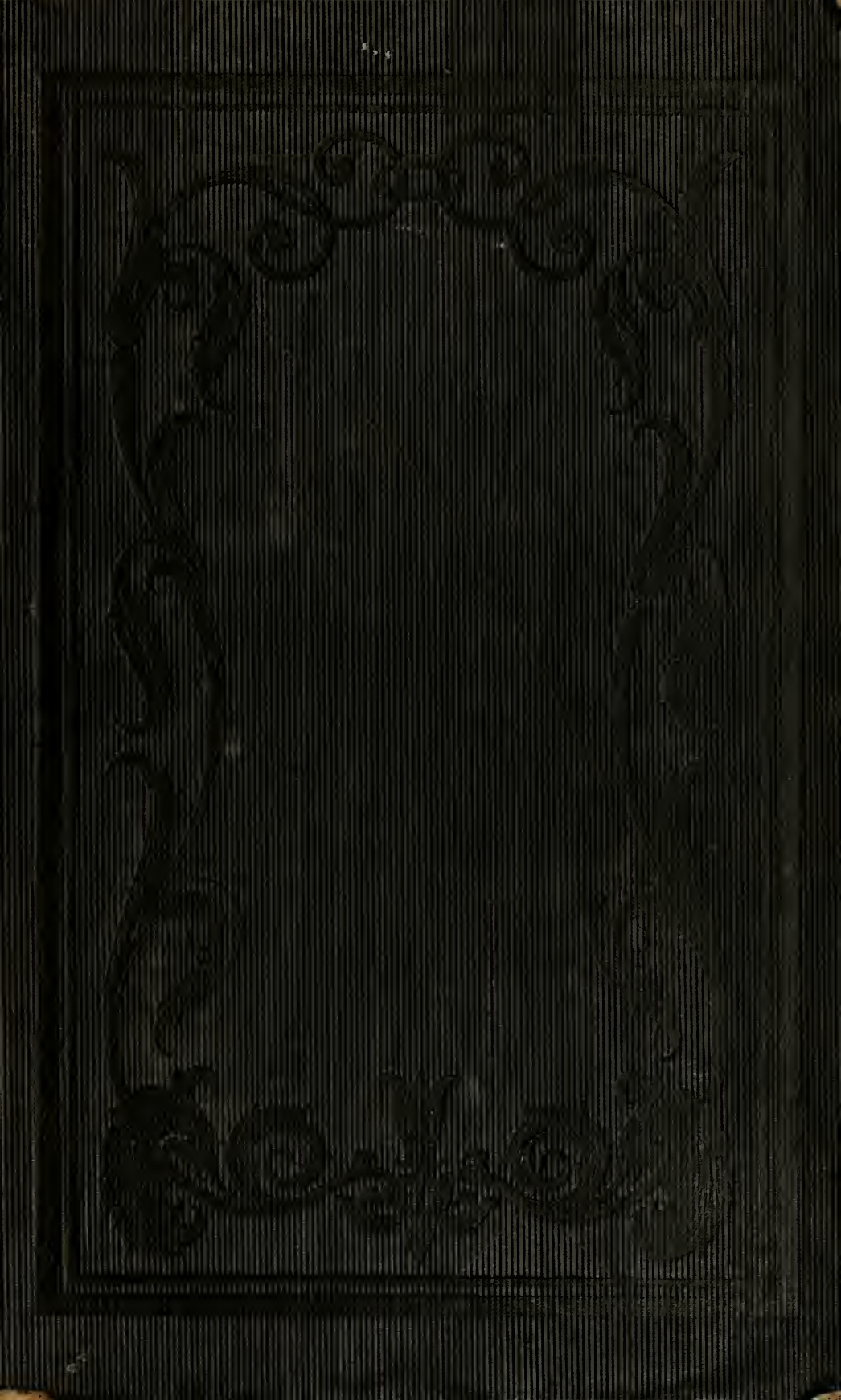


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THE

# MOTIVE POWER OF ORGANIC LIFE,

AND

## MAGNETIC PHENOMENA

OF

## TERRESTRIAL AND PLANETARY MOTIONS,

WITH THE

APPLICATION OF THE EVER-ACTIVE AND ALL-PERVADING AGENCY

OF

# MAGNETISM,

TO THE

## NATURE, SYMPTOMS, AND TREATMENT

OF

# CHRONIC DISEASES.

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# PREFACE.

In demonstrating the Motive Power of Organic Life in the following work, I have endeavoured to present the subject to the reader in a plain, concise, and simple manner, divested entirely of the abstruse metaphysics in which it has been heretofore involved.

The Motive Power is in the Nervous System, and hence the necessity of describing this system to show the connection of that power with it.

To effect the first object, I have availed myself of a general and concise description of the Nervous System, communicated to the British Association for the advancement of Science, by William Charles Henry, and also of a more particular description of it by Mr. Geo. Combe; to which I have added extracts from Spurzheim and Bichat, and a lecture of M. Broussais on the Cerebellum—all of which I have illustrated with numerous engravings; presenting, in the whole, the most popular and interesting views of the Nervous System, and of its Physiology, as taught in the rival schools of London and Paris.

In presenting the views of Terrestrial and Planetary Motions, derived from Magnetic Phenomena, with their attendant influences upon the Motive Power of Organic Life, I have adhered to my plan of giving to the reader in connection every subject in a plain and concise way, without halting in my course to notice every idle theory that has been invented to explain them.

On the subject of the application of the ever-active and all-pervading influence of Magnetism to the nature, symptoms, and treatment of Chronic Diseases, I have been guided by the immutable laws of the magnetic, natural or mechanical forces, which have resulted in the successful developement of the nature, symptoms, and treatment of a large class of chronic diseases, which have consigned to a premature grave, every

year, so many millions of the fairest, most amiable and talented portion of our race.

The almost uniformly disastrous results of the common treatment of this class of diseases, furnish a melancholy commentary on the uncertainty of the common symptoms,—as deplorable as the knowledge of the nature of the class of diseases founded upon them.

The best physicians have long deplored the want of that knowledge of these diseases which should produce the same satisfactory results as those obtained in the treatment of acute diseases. Dr. Armstrong commenced a long and arduous investigation of the character of chronic diseases, for the purpose of increasing our knowledge of their symptoms and treatment, but he did not live to finish the elaborate work which he contemplated on this subject.* In the mean time Professor Hahnemann insti-

* "If any one were to assert, in unqualified terms, that medicine is a conjectural and vague art, it were easy to refute him, by proving its great certainty in many acute diseases; and if any one were to ask what part of physic is most defective, we might point out chronic diseases, since in them our efforts have hitherto been the most ineffectual. It is for want of having discriminated the general difference of results in the treatment of acute and chronic diseases, that some have so much underrated, and others so much overrated, the powers of the medical art. Speak of acute diseases, and we may justly maintain the present utility of our profession; speak of chronic diseases, and we must with regret confess its present imperfection. If any practitioner should be generally unsuccessful in the treatment of acute diseases, the fault must be his own, provided he be consulted in the earliest stages: for the united agencies of blood-letting, purgatives, mercurials, opium, and blisters, will commonly control the very elements of these diseases, when opportunely and judiciously directed; and if any one will still be so stubborn as to reject the use of some of the most powerful instruments which we possess, the failures are rather to be attributed to himself, than to the inefficiency of medical treatment.

"As we cannot make such a confident declaration as to chronic diseases, though we can often palliate and sometimes cure them, we are constrained to acknowledge, either that their nature is more irremediable, or the means employed are less efficacious.

"The means which we administer in chronic diseases are numerous, but most of them ambiguous, and questionable at the best; whereas in acute diseases, our means are few, and their operation plain and indisputable. The long catalogue of prescriptions for chronic diseases, at once indicates that all is not right in our pathology, as it implies that each prescription is liable to fail, and that the whole may be successfully required.

"Wherever we have any thing like principles to guide us, *our prescriptions are extremely limited;* wherever we have no fixed principles to guide us, *our prescriptions accumulate with empirical rapidity.* But what, it may be reasonably enquired, is the principal cause of all this complexity of formulæ in chronic diseases? Undoubtedly it arises from that vagueness of opinion which exists respecting the nature of these diseases in their onset, and in the greater part of their progress; and so long as we attempt to cover our ignorance by such terms as *nervous*, *bilious*, *dyspeptic*, *spasmodic*, and the like, so long shall our practice be mere experiment in most chronic affections. We may make a sort of druggist's shop of the stomach of every patient laboring under chro-

tuted a new theory of the phenomena of diseases of every class, and founded his *Homœpathic* practice of infinitesimal doses of medicine upon it; which theory now distinguishes its votaries, and which, with *Animal* Magnetism, is now making progress both in Europe and this country.

M. Lugol, however, has no confidence in the common symptoms or treatment of tuberculous diseases known to the profession, and he calls uopn them to abandon both, and pursue some other which is less fallible.*

nic disease, by alternately cramming it with most of the articles of the pharmacopœas; but we shall not, probably, advance in the treatment, until we deduce pathological principles, from *cautiously marking the rise and progress of the symptoms, and exploring their seats and effects.* For several years past, it has been part of my employment to collect facts on chronic diseases, and as the enquiry will not be completed for many years to come, in the mean time I offer a few brief results of my observation and experience in regard to them, &c."

* From the Medico-Chirurgical Review, for January, 1841.

DISPARAGEMENT OF AUSCULTATION, BY M. LUGOL, OF PARIS.

The following are extracts from the fourth lecture on the formation of tubercles in internal organs:—

"The numerous checks and repeated deceptions to which physicians are daily exposed in the DIAGNOSIS and TREATMENT of tuberculous diseases, do they not prove that it is necessary to leave the beaten track of inquiry and pursue some other which is less fallible? You all know that auscultation and percussion are useless in the diagnosis of pulmonary tubercles. Both alike insufficient to announce the commencement of the mischief, they are superfluous at the very time that they become capable of indicating the presence of the tubercles; for then these are discoverable by other means, and, alas! are too far advanced in their developement to warrant our hopes of arresting their progress—at least in the generality of cases. I will even go a step farther, and say that the unlimited confidence placed by the greater number of practitioners of the present day in auscultation and percussion, has had the effect of too often inspiring a fatal security in many tuberculous diseases, which are thereby allowed to advance in their progress, until this is revealed by physical phenomena at a period when remedial measures have but little chance of effecting any good.

"But what are the means, you will say to me, that are to be substituted in the room of auscultation and percussion? I answer, gentlemen, induction. Examine by these boasted methods this patient, and tell me what results you obtain. Negative results, you will reply. And yet I maintain that he is tuberculous; for his father, his mother, and his brothers have all died of tuberculous disease; and he himself is affected with it in his chest at the present moment. Believe me, this plan is much less deceptive than the other one. I tell you, the inductive method cannot mislead you, for nature is invariable in its causes as in its effects; and the external signs of tuberculous scrofula must give you assurance that similar morbid productions exist in internal organs, especially in the lungs.†

"It is by viewing the question from this elevated point of view, by studying it in all

† M. Lugol is mistaken in regard to the certainty of this method; for nothing is more common than to find all the external signs of tuberculous disease, without tuberculisation of the lungs; and this fact is disclosed by the absence of the magnetic symptoms, while their presence give the first notice of the commencement of the disease in the lungs, even before the cough commences.

Such is the testimony of these men, and, I may add, that of every other physician whose opinion is of any value.

Notwithstanding, however, such testimony, which is verified by every day experience, a great majority of the profession are following the examples of the most arrant quacks, in pretending to be able to cure this class of diseases with the common remedies.

There are, also, some physicians, who, having given up every other remedy recommended in the books, still adhere to iodine, as a forlorn hope, notwithstanding it has been tested many thousand times by other physicians, and discarded as useless. Among the latter, I am pleased to be able to rank so distinguished a physician as Dr. Warren, of Boston. In a recent valuable work, he says :

"A medicine has been introduced of late years, which has acquired much reputation in this and other forms of scrofulous disease. It is not surprising that physicians should with avidity take up any remedy which may promise to relieve so common and inveterate a disease as scrofula, especially one analogous in its character to those of which experience has most approved. I must say that after many years trial of the preparations of iodine, in various forms of scrofulous affection, I have rarely seen any distinct advantages from it."

In speaking again of the cases in which iodine has been used, he says:

"Preparations of iodine have not been efficacious in those cases, so far as I have used them, The tincture of iodine has been given to the amount of forty-five drops three times a day. This quantity was sufficient to produce diarrhœa; but after a long use had no effect on the tumor. The same must be said of the hydriodates of soda and potassa, which I have frequently given in this and other scrofulous cases, in the dose of seven grains three or four times a day, till it irritated the stomach and bowels, without influencing the cure."

In order to ascertain the unknown causes of obvious effects, one of two modes is generally adopted. In the one generally chosen, in accordance

its *ensemble*, that you will be best enabled to comprehend it in its details; and these cannot be understood by the special methods of examination which have been so much recommended of late years.

"The tuberculisation of internal organs exhibits in its developement the same phenomena as tubercles which are outwardly situated—there is no pain, and nothing of mechanical derangements.

"The existence of tubercles in the lungs is so frequent, that I must admit that they are present in all scrofulous persons. You know that all, or almost all, patients, who have pulmonary tubercles, are, or have been at some time, affected with tubercles in the neck ; the majority have had during infancy this external sign of scrofula ; while others have had it at a later period of life. I believe that pulmonary tubercles frequently exist in early youth ; but it is chiefly about the age of puberty that they are apt to be developed.

with common philosophy, theories are first constructed, and then facts collected to confirm them; but a sufficient number is very rarely found for this purpose, and these theories, resting on slight foundations, are consequently almost always fallacious. In the other mode, which is according to inductive philosophy, a great number of corresponding facts is collected, and the theory or knowledge derived from a comparison of them is true and substantial.

The latter mode should always be adopted to establish a theory on a foundation that cannot be overturned. For if a theory in philosophy be true, the number of comparative facts that may be brought to its support, is absolutely innumerable and without end. So that if a certain number of facts is not sufficient to satisfy any person of the truth of the theory, any additional number can be presented to him, that may be necessary for such purpose.

The theory upon which this work is founded, is the result of that inductive process which has elicited the true causes of universal motion, and the laws by which it is governed; and the demonstrations on the electro-dynamic rings have since placed the hypothesis beyond a doubt.

The part of this theory which belongs to the human form, and to chronic diseases, derives, from the causes of motion, new and invariable symptoms of those diseases which belong to the class hypertrophy, or chronic swellings of the organs and limbs; and the laws of magnetic motion explain the causes of their phenomena.

When the discoveries thus made, were compared with the various theories of the medical profession on these subjects, it was easy to see how fallacious the latter necessarily were, and with what ease they might be overturned and buried for ever in one common ruin.

Entertaining the same views of our knowledge of this class of diseases, and of the remedies for it, with Dr. Armstrong, I commenced the investigation of the primary phenomena of this class of diseases in 1809, in a field, which had never been explored, with strong inducement to pursue it, and soon discovered new and unerring symptoms by which to distinguish the disease in any of the organs or limbs. The investigation of these symptoms unfolded the laws of motion in man and other animals, and a knowledge of these laws has enabled me to determine and apply the natural remedies for this class of diseases, with great success, during a period of more than twenty-five years.

In describing the cases, which I have introduced, to illustrate the new symptoms, and the action of the natural remedies for them, I have been as brief as possible, purposely avoiding reports of the state of the pulse, and other unimportant symptoms not necessarily belonging to the disease.

A great majority of the cases were first treated by other physicians, and besides mercury and iodine, had been under the use of a great variety of other remedies, and when these failed, many of the patients had resorted to root, steam, charm, Indian and cancer doctors, and to an endless variety of elixirs of health, purifiers of the blood, cough drops, panaceas, catholicons, and Indian specifics, and continued their use until they became satisfied of the futility of such remedies.

Some of these patients had taken from one to thirteen bottles of Swaim's Panacea, a compound of syrup of sarsaparilla and muriate of mercury, in imitation of the long known Lisbon diet drink. And although, from its frequent failure, very little dependence is now placed upon it, there can be no doubt that it sometimes exercises a favorable influence upon this class of diseases.

It will be observed by those who are acquainted with the classification of diseases, that I have added to the common and acknowledged cases of scrofula, a number of diseases not classed as such by nosologists or other medical writers; and I have done so, because the symptoms and the disorganizations, presented by dissections, are identical and uniform; and, moreover, because they can always be cured by the same remedies, which demonstrate the unity of chronic diseases of this class, by which the practice is greatly simplified, and a knowledge of it easily attained.

I have substituted the term *tubercula*, from *tuber*, a knot, knob, or little swelling, for *scrofula*, a little pig; because there is a manifest similarity between the verbal sign and the thing signified in the one selection, and apparently none in the other. The disease is a swelling of the knobs, or little round organized bodies called lymphatic glands, pervading every part of the body with consequent hypertrophy, or general swelling of the organs, limbs, and other structures.

# CONTENTS.

THE

# NERVOUS SYSTEM, ETC.

## CHAPTER I.

Objects of Physiology—Nervous System—Cerebrum, or Brain Proper—Cerebellum—Medulla Oblongata—Spinal Marrow—Nerves—Of Motion—Of Sensation—Of the Three Senses—Ganglionic System.

"THE science of Physiology has for its object to ascertain, to analyze, and to classify the qualities and actions which are peculiar to living bodies. These vital properties reside exclusively in organized matter, which is characterized by a molecular arrangement, not producible by ordinary physical attractions and laws. Matter thus organized consists essentially of *solids*, so disposed into an irregular network of laminæ and filaments, as to leave spaces occupied by *fluids* of various natures. "Texture" or "tissue" is the anatomical term by which such assemblages are distinguished. Of these the cellular, or *tela cellulosa*, is most elementary, being the sole constituent of several, and a partial component of all the tissues and systems. Thus the membranes and vessels consist entirely of condensed cellular substance; and even muscle and nerve are resolvable, by microscopic analysis, into globules deposited in attenuated cellular element.

But though the phenomena, which are designated as vital, are never found apart from organization, and have even by some natuaralists been regarded as identical with it, yet in the order of succession vital actions seem necessarily to stand to organized structures in the relation of antecedents; for the production of even the most rudimentary forms and textures implies the previous operation of combining tendencies or "vital affinities." The origin and early developement of these vital tendencies, and of organized structures, are beyond the pale of exact or even of approximative knowledge. But it is matter of certainty, that life is the

product only of life; that every new plant or animal proceeds from some pre-existent being of the same form and character; and thus that the image of the great Epicurean poet, "Quasi cursores vitai lampada tradunt," possesses a compass and force of illustration which, as a supporter of the doctrine of fortuitous production, he could not have himself contemplated.

The popular notions respecting life are obscure and indeterminate; nor are the opinions even of philosophers characterized by much greater distinctness or mutual accordance. Like other complex terms, "life" can obviously be defined only by an enumeration of the phenomena which it associates. This enumeration will comprehend a greater or smaller number of particulars, according to the station in the scale of living beings which is occupied by the object of survey. In its simplest manifestation, the principle of life may be resolved into the functions of nutrition, secretion, and absorption. It consists, according to Cuvier, of the faculty possessed by certain combinations of matter, of existing for a certain time and under a determinate form, by attracting unceasingly into their composition a part of surrounding substances, and by restoring portions of their own substance to the elements. This definition comprehends all the essential phenomena of vegetable life. Nutritive matter is drawn from the soil by the spreading fibres of the root, through the instrumentality of spongioles or minute turgid bodies at their extremities, which act, according to Dutrochet, by a power which he has called "endosmosis." The same agency raises the nutrient fluid through the lymphatic tubes to the leaves, where it seems to undergo a kind of respiratory process, and becomes fit for assimilation. These changes, and the subsequent propulsion of the sap to the different parts and textures, plainly indicate independent fibrilliary movements, which are represented in animal life by what Bichat has termed "the phenomena of organic contractility." The power residing in each part of detecting in the circulating fluid, and of appropriating matters fitted to renovate its specific structure, is designated in the same system by the term "organic sensibility."

Ascending from the vegetable to the animal kingdom, the term "life" advances greatly in comprehensiveness. The existence of a plant is limited to that portion of space in which accident or design has inserted its germ; while animals are for the most part gifted with the faculties of changing their place, and of receiving from the external world various impressions. Along with the general nutritive functions, the higher attributes of locomotion and sensation are therefore comprised in the extended compass of meaning which the term "life" acquires with the prefix "animal." The nutritive functions, too, emerging from their original simplicity, are accomplished by a more complex mechanism, and by agencies further removed from those which govern the inanimate world.

Locomotion is effected either by means of a contractile tissue, or of distinct muscular fibres. These fibres have been said to consist of globules resembling, and equal in magnitude to, those of the blood, disposed in lines, in the elementary cellulosity, which by an extension of the analogy is compared to serum. But the latest microscopical observations of Dr. Hodgkin are opposed to this globular constitution of the contractile fibre. "Innumerable very minute but clear and fine parallel lines or striæ may be distinctly perceived, transversely marking the fibrillæ." Irritability, or the faculty of contracting on the application of a stimulant, is a property inherent in the living fibre. It is an essential element of all vital operations, except of those which have their seat in the nervous system, such as sensation, volition, the intellectual states, and moral affections. All the phenomena of life, in the higher animals, may then be ultimately resolved into the single or combined action of these two elementary properties,—irritability and nervous influence, each residing in its appropriate texture and system.

These preliminary remarks are designed to unfold the principles to be followed in classifying the vital functions. In general or comparative physiology, a strictly scientific arrangement would contemplate first the phenomena of the most elementary life, and would successively trace the more perfect developement of those simple actions and their gradual transition into more complex processes, as well as the new functions, superadded in the ascending scale of endowment. But such a mode of classification is wholly inapplicable to the particular physiology of man and of the more perfect animals, viewed by itself and without reference to inferior orders of beings; for the nutritive functions of this class, which correspond with the elementary actions of the simplest vegetable life, are effected by a complex system of vessels and surfaces, deriving their vital powers from contractile fibres, and controlled, if not wholly governed by nervous influence. It is then manifest, that in the higher physiology the general laws of contractility and "innervation" must precede the description of the several functions, which all depend on their single or united agency. The particular functions will afterwards be classed, as they stand in more immediate relation to one or other of the two essential principles of life.

In the present state of physiological knowledge, it is impossible to determine absolutely, and without an opening to controversy, whether the functions of muscle or those of nerve are entitled to precedency. If each were equally independent of the other in the performance of their several offices, the question of priority would resolve itself into one of simple convenience. The actions of the nervous system, if contemplated for the short interval of time during which they are capable of persisting without renovation of tissue, are entirely independent of the

contractile fibre. But it is certain that the cooperation of nerve is required in most, if not in all, the actions of the muscular system. Thus the voluntary muscles in all their natural and sympathetic contractions receive the stimulant impulse of volition through the medium of nerve; and though the mode, in which the motive impression is communicated to the involuntary muscles, is still matter of controversy, there seems sufficient evidence* to sanction the conclusion that nerve is in this case also the channel of transmission;—"that the immediate antecedent of the contraction of the muscular fibre is universally a change in the ultimate nervous filament distributed to that fibre." If this be correct, the physiological history of muscle cannot be rendered complete without reference to that of nerve.

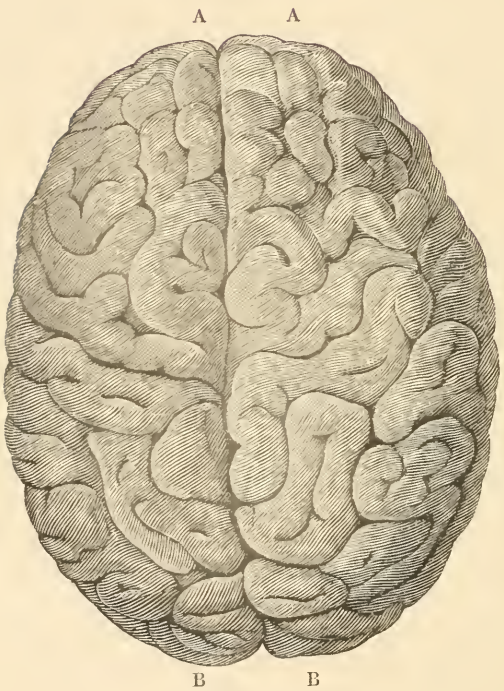
In the higher manifestations of life, nervous matter is invested with the most eminently vital attributes. It is the exclusive seat of the various modes of sensation, and of all the intellectual operations; or, rather, it is the point of transition, where the physical conditions of the organs, which are induced by external objects, pass into states of mind, becoming perceptions; and where the mental act of volition first impresses a change on living matter. These two offices of conducting motive impressions from the central seat of the will to the muscles, and of propagating sensations from the surface of the body and the external organs of sense to the sensorium commune, have been of late years shown to reside in distinct portions of nervous substance.

The honour of this discovery, doubtless the most important accession to physiological knowledge since the time of Harvey, belongs exclusively to Sir Charles Bell. It constitutes, moreover, only a part of the new truths, which his researches have unveiled, regarding the general laws of nervous action, and the offices of individual nerves. His successive experiments on function, guided always by strong anatomical analogies in structure, in origin, or in distribution, have led to the entire remodelling of nervous physiology, and to the formation of a system of arrangement, based on essential affinities and on parity of intimate composition, instead of on *apparent* sequence or proximity of origin. Among the continental anatomists, MM. Magendie and Flourens have contributed most largely to our knowledge of this part of physiology; the former by repeating and confirming the experiments of Bell, as well as by various original inquiries; the latter by his important researches into the vital offices of the brain and its appendages. Much light, too, has been thrown on the functions of several of the encephalic nerves, and especially of those supplying the face and its connected cavities, by Mr. Herbert

* See "A Critical and Experimental Enquiry into the Relations subsisting between Nerve and Muscle," in the 37th vol. of the *Edinburgh Medical and Surgical Journal.*

FIG. 1.

View of the top of the Brain.




A A—Front part of the Brain.

A A } Right and left hemisphere.
B B }

Mayo, who has analyzed their anatomical composition, and pursued their course with singular precision, and has thus been enabled to correct some errors of detail in the system of Sir Charles Bell.

### NERVOUS SYSTEM.

In man, and in other vertebrated animals, the nervous system consists of the cerebrum, cerebellum, medulla oblongata, medulla spinalis, and of the encephalic, spinal, and ganglionic nerves. It seems most natural to observe this order of anatomical sequence in recording what is known of nervous functions.

### CEREBRUM, OR BRAIN-PROPER.

The physiology of the brain has received of late years very considerable accessions, and its vital offices, *viewed as an entire organ*, have now probably been ascertained with sufficient precision. Some portion of this newly acquired knowledge has been gathered from experiments on living animals, but the greater and more valuable part has flowed from the study of comparative developement. In this latter field of inquiry, Tiedemann's elaborate history of the progressive evolution of the human brain during the period of fœtal existence, with reference to the comparative structure of that organ in the lower animals, merits an early and detailed notice. It had been discovered by Harvey, that the fœtus in the human species, as well as in inferior animals, is not a precise facsimile of the adult, but that it commences from a form infinitely more simple, and passes through several successive stages of organization before reaching its perfect developement. In the circulatory system, these changes have been minutely observed and faithfully recorded*. Tiedemann has traced a similar progression in the brain and nervous system, and has moreover established an exact parallel between the *temporary* states of the fœtal brain in the periods of advancing gestation, and the *permanent* developement of that organ at successive points of the animal scale. The first part of his work is simply descriptive of the nervous system of the embryo at each successive month of fœtal life. It constitutes the anatomical groundwork upon which are raised the general laws of cerebral formation, and the higher philosophy of the science. In the second part, Tiedemann has established, by examples drawn from all the

* See an excellent Essay on the *Developement of the Vascular System in the Fœtus of Vertebrated Animals*, by Dr. Allen Thomson.

grand divisions of the animal kingdom, the universality of the law of formation, as traced in the nervous system of the human fœtus, and the existence of one and the same fundamental type in the brain of man and of the inferior animals.

The facts which have been unfolded by the industry of Tiedemann, besides leading to the universal law of nervous developement, throw important light upon nervous function: for it is observed that the successive increments of nervous matter, and especially of brain, mark successive advances in the scale of being; and, in general, that the developement of the higher instincts and faculties keeps pace with that of brain. Thus, in the zoophyta, and in all living beings destitute of nerves, nothing that resembles an instinct or voluntary act is discoverable. In fishes the hemispheres of the brain are small, and marked with few furrows or eminences. In birds they are much more voluminous, more raised and vaulted than in reptiles; yet no convolutions or anfractuosities can be perceived on any point of their surface, nor are they divided into lobes. The brain of the mammalia approaches by successive steps to that of man. That of the rodentia is at the lowest point of organization. Thus the hemispheres in the mouse, rat, and squirrel are smooth and without convolutions. In the carnivorous and ruminating tribes, the hemispheres are much larger and marked by numerous convolutions. In the ape tribe the brain is still more capacious and more convex; it covers the cerebellum, and is divided into anterior, middle, and posterior lobes. It is in man that the brain attains its greatest magnitude and most elaborate organization. Sommerring has proved that the volume of the brain, referred to that of the spinal marrow as a standard of comparison, is greater in man than in any other animal.

Various attempts have been made of late years, chiefly by the French physiologists, to ascertain the functions of the brain by actual experiment. It will appear from a detailed survey of their labours, that little more than a few general facts respecting the function of its *larger* masses and great natural divisions have flowed from this mode of research. The offices of the *smaller* parts of cerebral substance cannot with any certainty be derived from the phenomena that have been hitherto observed to follow the removal of those parts, since the most practised vivisectors have obtained conflicting results. Nor is it difficult, after having performed or witnessed such experiments, to point out many unavoidable sources of fallacy. In operations on living animals, and especially on so delicate an organ as the brain, it is scarcely possible for the most skilful manipulator to preserve exact anatomical boundaries, to restrain hæmorrhage, or prevent the extension to contiguous parts, of the morbid actions consequent upon such serious injuries, and to distinguish the secondary and varying phenomena, induced by the pressure of extrava-

sated blood, or the spread of an inflammatory process, from those which are essential and primary. The ablation of small and completely insulated portions of brain must, then, be classed among the "agenda" of experimental physiology.

The most decisive researches, that have been hitherto instituted on the functions of the brain, are those of M. Flourens. His mode of operating was to remove cautiously successive thin slices of cerebral matter, and to note the corresponding changes of function. He commenced with the hemispheres of the brain, which he found might be thus cut away, including the corpora striata and thalami optici, without apparently occasioning any pain to the animal, and without exciting convulsive motions. Entire removal of the cerebrum induces a state resembling coma; the animal appears plunged in a profound sleep, being wholly lost to external impressions, and incapable of originating motion; it is deprived, too, according to Flourens, of every mode of sensation. Hence the cerebrum is inferred to be the organ in which reside the faculties of perception, volition and memory. Though not itself sensible, in the ordinary acceptation of the word,—that is, capable, on contact or injury, of propagating sensation,—yet it is the point where impressions made on the external organs of sense become objects of perception. This absence of general sensibility observed in the brain has also been experimentally demonstrated in the nerves dedicated to the functions of sight, of smell and of hearing, and constitutes, perhaps, one of the most remarkable phenomena that have been disclosed by interrogating living nature. Flourens appears, however, to have failed in proving that *all* the sensations demand for their perception the integrity of the brain. He has himself stated that an animal deprived of that organ, when violently struck, "has the air of awakening from sleep," and that if pushed forwards, it continues to advance after the impelling force must have been wholly expended. Cuvier has therefore concluded, in his Report to the Academy of Sciences upon M. Flourens' paper, that the cerebral lobes are the receptacle in which the impressions made on the organs of sight and hearing only, become perceptible by the animal, and that probably there too all the sensations assume a distinct form, and leave durable impressions,—that the lobes are, in short, the abode of memory. The lobes, too, would seem to be the part in which those motions which flow from spontaneous acts of the mind have their origin. But a power of effecting regular and combined movements, on *external stimulation*, evidently survives the destruction of the cerebral hemispheres.

A very elaborate series of experiments on the functions of the brain in general, and especially on those of its anterior portion, have been since performed by M. Bouillaud*. That observer concurs with Flourens in

*Magendie, *Journal de Physiologie*, tom. x. p. 36.

viewing the cerebral lobes as the seat of the *remembrance* of those sensations which are furnished to us by sight and hearing, as well as of all the intellectual operations to which these sensations may be subjected, such as comparison, judgment and reasoning. But he proves that the ordinary tactual sensibility does not require for its manifestation the presence of the brain. For animals entirely deprived of brain were awakened by being struck, and gave evident indications of suffering when exposed to any cause of physical pain. Bouillaud observes, too, that the iris continues obedient to the stimulus of light, after ablation of the hemispheres, and on this ground calls in question the loss of vision asserted by Flourens. Nor are the lobes (he contends,) the only receptacle of intelligence, of instincts and of volition: for to admit this proposition of Flourens would be to grant that an animal which retains the power of locomotion, which makes every effort to escape from irritation, which preserves its appropriate attitude, and executes the same movements after as before mutilation, may perform all those actions without the agency of the will or of instinct. Another doctrine of Flourens, which has been experimentally refuted by Bouillaud, is, "that the cerebral lobes concur *as a whole* in the full and entire exercise of their functions; that when one sense is lost, all are lost; when one faculty disappears, all disappear;" in short, that a certain amount of cerebral matter may be cut away without apparent injury, but that when this limit is passed, all voluntary acts and all perceptions perish simultaneously. Bouillaud, on the contrary, has described several experiments which show that animals, from whom the anterior or frontal part of the brain had been removed, preserved sight and hearing, though deprived of the knowledge of external objects, and of the power of seeking their food.

The second part of M. Bouillaud's researches is entirely devoted to the functions of the anterior lobes of the brain. These were either removed by the scalpel, or destroyed by the actual cautery, in dogs, rabbits and pigeons. Animals thus mutilated feel, see, hear and smell; are easily alarmed, and execute a number of voluntary acts, but cease to recognise the persons or objects which surround them. They no longer seek food, or perform any action announcing a combination of ideas. Thus the most docile and intelligent dogs lost all power of comprehending signs or words which were before familiar to them, became indifferent to menaces or caresses, were no longer amenable to authority, and retained no remembrance of places, of things, or of persons. They saw distinctly food presented to them, but had ceased to associate with its external qualities all perception of its relations to themselves as an object of desire. The anterior or frontal part of the brain is hence inferred to be the seat of several intellectual faculties. Its removal occasions a state resembling idiotism,

characterized by loss of the power of discriminating external objects, which, however, co-exists with the faculties of sensation.

It will be unnecessary to describe fully in this place the experiments of Professor Rolando, of Turin, performed in 1809, and published in Magendie's *Journal*, tom. iii., 1823, since the more important of his facts have reference, not to the brain-proper, but to the cerebellum. His paper certainly contains some curious anticipations of phenomena, since more accurately observed by Flourens and Magendie; yet as regards the brain, properly so called, his results are vague and inconclusive. Accident, rather than a well matured design, seems to have directed what parts of the brain he should remove; and from having comprehended in the same injury totally distinct anatomical divisions, he has rendered it impossible to arrive at the precise function of any one part. Thus we are told that injury of the thalami optici and tubercula quadrigemina in a dog was followed by violent muscular contractions. Now all subsequent experimenters agree, that irritation of the thalami is incapable of inducing convulsive motions; and Flourens has proved that this property has its beginning in the tubercula,—an important fact, which Rolando, with a little more precision in anatomical manipulation, could scarcely have failed to discover.

Magendie has described* some curious experiments on the corpora striata, which, though closely analogous in their results to those on the cerebellum, have their proper place in this section. Removal of one corpus striatum was followed by no remarkable change; but when both had been cut away, the animal rushed violently forwards, never deviating from a rectilinear course, and striking against any objects in its way. In his lecture of February 7, 1828, Magendie, in the presence of his class, removed both corpora striata from a rabbit. The animal attempted to rush forwards, and, if restrained, appeared restless, continuing in the attitude of incipient progression. One thalamus opticus was then cut away from the same animal. The direction of its motion was immediately changed from a straight to a curved line. It continued for some time to run round in circles, turning towards the injured side. When the other thalamus was removed, the animal ceased its motions and remained perfectly tranquil, with the head inclined backwards. These experiments, it may be observed, furnish no support to the opinions of MM. Foville and Pinel Grandchamps, who have assigned the anterior lobes and corpora striata as the parts presiding over the movements of the inferior extremities, and the posterior lobes and thalami as regulating the superior.

* *Journal de Physiologie*, tom. iii. p. 376

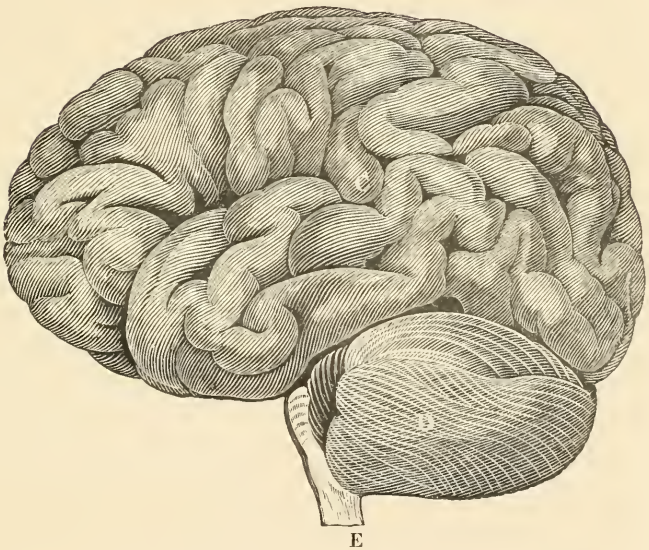
It may be regarded as nearly established by modern researches, that the cerebellum is more or less directly connected with the function of locomotion. The precise nature and extent of its control over the actions of the voluntary muscles are, however, far from being clearly determined. In the higher animals, the mental act of volition probably has its commencing point, as productive of a physical change, in the brain-proper; though it must be confessed that some of the experiments of Flourens, and all of those of Bouillaud, indicate the persistance of many instinctive, and even of some automatic motions, after destruction of the brain. But there *does* appear sufficient evidence to prove that those volitions which have motion as their effect, whatever be their origin, whether in the cerebrum, cerebellum, or medulla oblongata,* require for their accomplishment the co-operation of the cerebellum. This evidence has been mainly supplied by the same inquirers whose researches on the cerebrum have been already analyzed.

In the order of time, though not of importance, the experiments of Professor Rolando stand foremost. Injuries of the cerebellum, he observed, were always followed by diminished motive power; and this partial loss of power was always in direct proportion to the amount of injury. A turtle survived upwards of two months the entire removal of the cerebellum, continuing sensible to the slightest stimulus; but when irritants were applied, it was totally unable to move from its place. M Flourens has since arrived at similar, but more definitive results. He removed in succession thin slices from the cerebellum. After the first two layers had been cut away, a slight weakness and want of harmony and system in the automatic movements were noticed. When more cerebellic substance had been removed, great general agitation became apparent. The pigeon, which was the subject of operation, retained, as at first, the senses of sight and hearing, but was capable of executing only irregular unconnected muscular efforts. It lost by degrees the power of flying, of walking, and even of standing. Removal of the whole cerebellum was followed by the entire disappearance of motive power. The animal, if laid upon its back, tried in vain to turn round; it perceived and was apprehensive of blows, with which it was menaced, heard sounds, seemed aware of danger, and made attempts to escape, though ineffectually,—in short, while it preserved, uninjured, sensation and the exercise of volition, it had lost all power of rendering its muscles obedient to the will. The cerebellum is hence supposed by Flourens to be invested with the office of "ballancing, regulating or combining separate sets of muscles and limbs, so as to

* Flourens, *Memoires de l'Academie*, tom. ix.

FIG. 2.

Side view of the brain, cerebellum, and medulla oblongata.




C—Cerebrum.

D—Cerebellum.

E—Medulla oblongata.

bring about those complex movements depending on simultaneous and conspiring efforts of many muscles, which are necessary to the different kinds of progressive motion." Bouillaud, who has successfully disputed several of the opinions of Flourens respecting the functions of the cerebrum, fully concurs with him as to those of the cerebellum.

Yet, it must be admitted, that there exists also conflicting expermental testimony on this subject. M. Fodera* states that he has found the removal of a part of the cerebellum to be followed, in all cases, either by motion *backwards*, or by that position of the body which precedes retrograde movement. The head is thrown back, the hind legs separated, and the fore legs extended forwards, and pressed firmly against the ground. More complete destruction of the cerebellum occasions the animal to fall on its side; but the head is still inclined rigidly backwards, and the anterior extremities agitated with convulsive movements, tending to cause retrograde motion of the body. Injuries of one side of the cerebellum were observed to produce paralysis of the same side of the body; as might, indeed, have been anticipated from the direct course, without decussation, of the restiform columns which ascend to form the cerebellum. Magendie has described† precisely the same results. A duck, whose cerebellum had been destroyed, could swim only backwards. In the course of his experimental lectures, Magendie, having removed the cerebellum in several rabbits, demonstrated to his class the phenomena of retrograde movement, exactly as they have been recorded by Fodera. It is, then, impossible to regard the conclusions of Flourens as fully established, opposed as they are by those of so skilful an experimenter as Magendie. Indeed, while Flourens conceives the cerebellum to preside over motion, MM. Foville and Pinel Grandchamps attribute to it the directly opposite function of sensation: and this doctrine seems to derive some support from anatomical disposition; for it has been proved by Tiedemann that the cerebellum is nothing more than an expansion or prolongation of the corpora restiformia, and posterior columns of the spinal medulla, which columns have been shown by Sir Charles Bell to have the office of conveying sensations. But it is not the less true that all recent experiments, even those of Fodera and Magendie, point to some connexion between the cerebellum and the power of voluntary motion. In the present state of our knowledge it would be unsafe to contend for more than the probable existence of some such general relation.

This, then, is all that seems deserving of confidence respecting the functions of the cerebellum itself. But there are some singular phenomena which, though residing in other structures more or less near to the cerebellum, are so analogous to those already described as to call for notice in

* *Journal de Physique*, July, 1823. † *Ibid.* tom. iii. p. 157.

this place. Magendie has described* the results of injury to the crura cerebelli of a rabbit. Complete division of the right crus was followed by rapid and incessant rotation of the body upon its own axis, from left to right. This singular motion having continued two hours, Magendie placed the rabbit in a basket containing hay. On visiting it the following day he was surprised to find the animal still turning round as before, and completely enveloped in hay. The eyes were rigidly fixed in different lines; that of the injured side being directed forwards and downwards, that of the other side backwards and upwards. If both crura were divided, no motion followed. Magendie hence concluded that these nervous cords are the conductors of impulsive forces which counterbalance one another, and that from the equilibrium of these two forces result the power of standing, and even of maintaining a state of rest, and of executing the different voluntary motions. The inquiry naturally presented itself, whether these forces are inherent in the crura themselves, or emanate from the cerebellum or some other source. To determine this question, portions of substance were removed from both sides of the cerebellum, but unequally, so as leave intact three-fourths on the left side and one-fourth only on the right. The animal rolled towards the right side, and its eyes were fixed in the manner already described. But the left crus being divided, the animal rolled to the left side. Hence it appears that section of the crus has more influence over the lateral rotation of the body than injury of the cerebellum itself; and that the impulsive force does not belong (at least exclusively) to the cerebellum. When the cerebellum was divided precisely in the median line, the animal seemed suspended between two opposing forces, sometimes inclining towards one side, as if about to fall, and again thrown suddenly back to the opposite side. Its eyes were singularly agitated, and seemed about to start from the orbits. Similar movements followed division of the continuous fibres in the pons Varolii. Serres has described a case of similar rotary motion occurring in the human subject. A shoemaker habituated to excess in alcoholic liquors, after great intemperance, was seized with an irresistible disposition to turn round upon his own axis, and continued to move so till death ensued. On inspecting the brain, one of the crura cerebelli was found much diseased, and this was the only alteration of structure visible in any part of the nervous system.

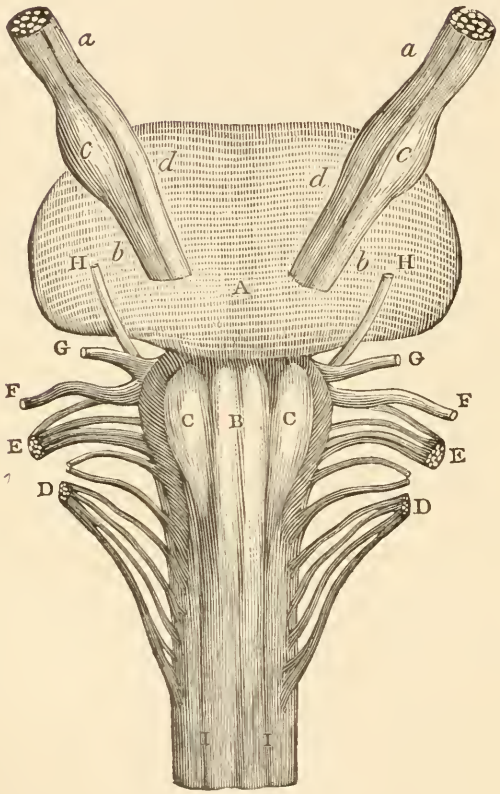
M. Flourens has published in a recent volume of the *Memoires de l'Academie des Sciences*† a description of some striking abnormal motions which followed the division of the semicircular canals of the ears of birds. Though these organs have no anatomical relation to the cerebrum or cerebellum, the altered motions resulting from their division are so analogous

* *Journal de Physiologie*, tom. iv. 399

† Tom. ix. p. 454.

FIG. 3.

A front view of the Medulla Oblongata, lateral nerves, Pons Varolii, and fifth pair of nerves.




M—Medulla oblongata. A—Pons Varolii. B—Corpus Pyramidale. C—Corpus Olivary. D—Spinal accessory nerve. E—Par Vagum. F—Glosso-Pharyngeal nerve. G—Portio Dura of the seventh. H—Fourth Nerve. I I—Anterior column of the Spinal Cord. a—Fifth nerve. b—Ganglionic branch of the fifth nerve. c—Ganglion. d—Motor branch of the fifth nerve.

to those observed by Magendie after lesions of the corpora striata and crura, that they may be most conveniently described in the same section. Two of the semicircular canals are vertical, and one horizontal. Division of the horizontal canals on each side occasioned a rapid horizontal movement of the head from right to left, and back again, and loss of the power of maintaining an equilibrium, except when standing, or when perfectly motionless. There was also the same singular rotation of the animal round its own axis which follows injury of the crura cerebelli. Section of the inferior vertical canal on both sides produced violent vertical movements of the head, with loss of equilibrium in walking or flying. There was in this case no rotation of the body upon itself, but the bird fell backwards, and remained lying on its back. When the superior vertical canals were divided, the same phenomena were observed as in section of the inferior, except that the bird fell forward on its head, instead of backward. All the canals, both vertical and horizontal, having been divided, in another pigeon, violent and irregular motions in all directions ensued. When, however, the bony canals were so cautiously divided as to leave their internal membranous investment uninjured, these abnormal motions were not produced. It is, therefore, in these membranes, or rather in the expansion of the acoustic nerve which overspreads them, that the cause of this phenomenon must reside. No explanation is proposed by Flourens of the control thus exercised by a nerve supposed to minister exclusively to the sense of hearing, over actions so entirely opposite in character. It is remarkable that the irregular movements should observe the same direction in their course as the canals, by the section of which they are induced. Thus the direction of the inferior vertical canal is posterior, that of the superior is anterior, corresponding perfectly with the directions of the abnormal motions.

### MEDULLA OBLONGATA.

The medulla oblongata, or "bulbe rachidien," is reducible into six columns, or three pairs, viz: two anterior or pyramidal, which partially decussate, two middle or olivary, and two posterior or restiform, which proceed forwards without crossing. It is continuous in structure with the spinal marrow, and enjoys, by virtue of this relation, the same function of propagating motion and sensation. But it is distinguished from the spinal medulla by special and higher attributes, being endowed with the faculty of originating motions, as well as with that of regulating and conducting them. The medulla oblongata, with the cerebrum and cerebellum, constitute, in short, according to Flourens,* those portions of the nervous sys-

* *Memoires de l'Academie des Sciences*, tom. ix. p. 478

tem which exercise their functions "spontaneously or primordially," and which originate and preside over the vital actions of the subordinate parts. To this latter order of parts, which require an exciting or regulating influence, belongs the spinal medulla. In the superior class, Flourens seems to assign even a higher place to the medulla oblongata than to the cerebrum or cerebellum. For the cerebrum, he observes, may act without the cerebellum; and this latter organ continues to regulate the motions of the body after removal of the cerebrum. But the functions of neither cerebrum nor cerebellum survive the destruction of the medulla oblongata, which seems to be the common bond and central knot combining all the individual parts of the nervous system into one whole.

The medulla oblongata was regarded by Legallois as the mainspring or "premier mobile" of the inspiratory movements. He repeated before a Commission of the Institute of France the leading experiments on which his opinion rested.* In a rabbit, five or six days old, the larynx was detached from the os hyoides and the glottis exposed to view. The brain and cerebellum were then extracted without arresting the inspirations, which were marked by four simultaneous motions,—a gaping of the lips, an opening of the glottis, the elevation of the ribs, and the contraction of the diaphragm. Legallois next removed the medulla oblongata, when all these motions ceased together. In a second rabbit, instead of extracting at once the entire medulla, it was cut away in successive thin slices. The four inspiratory movements continued after the removal of the three first slices, but ceased after the fourth. It was found that the fourth had reached the origin of the eighth pair of nerves. If, instead of destroying the part in which this motive influence resides, it be simply prevented from communicating with the muscles, which are subservient to inspiration, a similar effect ought to be produced. Now it is obvious that the medulla oblongata must transmit its influence to the muscles which raise the ribs, through the medium of the intercostal nerves, and therefore of the spinal marrow, and to the diaphragm through the phrenic nerves, and to these through the spinal marrow. In another rabbit, therefore, the medulla spinalis was cut across about the level of the seventh cervical vertebra. The effect of this operation was to arrest the elevation of the ribs, the other three inspiratory motions still continuing. A second section was made near the first cervical vertebra, and consequently above the origin of the phrenic, with the effect of suspending the contraction of the diaphragm. The par vagum was next divided in the neck, and the opening of the glottis ceased. There remained then, of the four inspiratory movements, only the gaping of the lips, which, however, was sufficient to attest that the medulla oblongata still retained the power

* *Œuvres de Legallois*, tom. i. p. 247

of producing them all. This power had ceased to call forth the other three motions, only because it no longer had communication with their organs.

M. Flourens, in a recent memoir already referred to,* has confirmed and extended the views first announced by Legallois. He has distinctly traced the comparative action of the medulla spinalis and oblongata, on respiration, in the four classes of vertebrated animals. In birds, he found that all the lumbar and the posterior dorsal medulla might be destroyed without impeding the respiratory function, though it was arrested by removal of the costal medulla. In the mammalia the costal also might be removed, for though the raising of the ribs ceased, the action of the diaphragm continued as long as the origin of the phrenic nerve remained uninjured. In frogs, all the spinal medulla may be destroyed, except the portion whence spring the nerves supplying the hyoideal apparatus. Every part of the spinal marrow may be removed in fishes without affecting respiration; for all the nerves distributed to the respiratory organs of fishes have their origin in the medulla oblongata. It is hence apparent that the spinal marrow exercises only a variable and relative action on the respiratory function, in the different classes of vertebrated animals. In descending from the higher to the lower points of this scale, the spinal marrow is seen progressively to disengage itself from cooperation in these movements, while the medulla oblongata tends more and more to concentrate them in itself, till in fishes the proper functions of the two medullæ show themselves completely distinct, the spinal ministering to locomotion and sensation, and the oblongata to respiration. The medulla oblongata is, then, the "premier moteur," or the exciting and regulating principle of the inspiratory movements in all classes of vertebrated animals; besides participating, by virtue of its continuity with the spinal marrow, in the proper functions of that organ. From a second series of experiments, M Flourens concludes that there exists a point in the nervous centres at which the section of those centres produces the sudden annihilation of all the inspiratory movements; and that this point corresponds with the origin of the eighth pair of nerves, commencing immediately above, and ending a little below, that origin,—a result precisely agreeing with that obtained by Legallois.

### SPINAL MARROW

It is apparent that the functions of the three grand divisions of the nervous system, already described, have not yet been distinctly and fully as-

* *Memoires de l'Academie*, tom. ix. 1830

certained. Our knowledge of those, which next fall under survey, is more definite and substantial. The vital offices of the spinal medulla—regarded by Legallois as the mainspring of life, and as alone regulating the actions of the heart and nobler organs,—are now reduced to conveying to the muscles the motive impulse of volition, and to propagating to the sensorium commune, impressions made on the external senses. It is not invested with the power possessed by the cerebrum and cerebellum, and perhaps by the medulla oblongata, of spontaneously originating muscular motions. It is mainly, if not exclusively, a *conductor;* a medium of communication between the brain and the external instruments of locomotion and sensation. Flourens, indeed, conjectures that it also has the office of associating the partial contractions of individual muscles into "mouvemens d'ensemble," necessary to the regular motions of the limbs.

Before recording what is known of the spinal cord itself, it will be proper to advert to some recent experiments of Magendie on the serous fluid in which it is immersed. It would appear that a quantity of liquid, varying from two to five ounces in the human subject, is always interposed between the arachnoid tunic and the pia mater, or proper membrane of the cord. The intermembranous bag, occupied by this fluid, communicates with the ventricular cavities at the calamus scriptorius by a round aperture, often large and patent in hydrocephalic subjects. Magendie has therefore named this serous liquid "cerebro-spinal." In living animals, it issues in a stream from a puncture of the arachnoid. Its removal occasions great nervous agitation, and symptoms resembling those of canine madness. The sudden increase of its quantity induces coma. Its presence seems essential to the undisturbed and natural exercise of the nervous functions ; and this influence probably is dependent upon its pressure, temperature, and chemical constitution, since any variation of these conditions is followed by the phenomena of nervous disorder.

The great medullary cord is divided by a double furrow into two lateral halves ; and each of these is again subdivided by the insertions of the ligamenta dentata into two columns, one posterior and one anterior. It has been long known that section of any part of the spinal marrow excludes from intercourse with the brain all those parts of the body which derive their nerves from the cylinder of medulla *below* the point of injury. The muscles, so supplied, are no longer obedient to the control of the will, and the tegumentary membranes similarly situated entirely lose their sensibility. This interruption of the relations which subsist between the central seat of volition and sensation, and the rest of the body, whether due to direct injury of the great nervous masses or communicating nerves, or produced by the pressure of extravasated fluids, by morbid growths, or by various poisonous matters, constitutes the condition known by the name "paralysis." In cases of this kind it is frequently observed that

the powers of sensation and locomotion are simultaneously impaired or destroyed. But examples are not wanting, even in the earliest clinical records, of the total loss of one of those faculties with perfect integrity of the other. Such facts naturally suggested the belief that the power of propagating sensations, and that of conveying motive impressions, resided in distinct portions of the nervous system. This opinion, however, remained mere matter of conjecture until a recent period, when it was unequivocally established by Sir Charles Bell. From the original experiments of that most distinguished physiologist, repeated and confirmed by Magendie, it follows that the faculty of conducting sensations resides exclusively in the two posterior columns of the medulla, while that of communicating to the muscular system the motive stimulus impressed by volition is the attribute of the two anterior columns. The same limitation of function is found in the nervous roots which spring from these separate columns. Thus, each spinal nerve is furnished with a double series of roots, one set of which have their origin in the anterior medullary column, and one in the posterior. The spinal nerves are, in consequence of this anatomical composition, nerves of two fold function, containing in the same sheath distinct continuous filaments from both columns, and exercising, in the parts to which they are distributed, the double office of conductors of motion and sensation. It will afterwards appear, in our history of individual nerves, that all those which spring from the brain, except the fifth and eighth pairs, possess only a single function.

Sufficient experimental proof of the foregoing propositions has been furnished by Sir Charles Bell and by M. Magendie. Thus, division of the posterior roots of the spinal nerves is uniformly followed by total absence of feeling in the parts of the body to which the injured nerves are distributed, while their motive power remains undiminished. Magendie has further observed, that if the medullary canal be laid open, and the two posterior cords be touched or pricked slightly, there is instant expression of intense suffering; whereas, if the same or a greater amount of irritation be applied to the anterior columns, there are scarcely any signs of excited sensibility. The central parts of the medulla seem also nearly impassible.* They may be touched, and even lacerated, according to Magendie, without exciting pain, if precautions are taken to avoid the surrounding medullary substance. In general, the properties of the spinal marrow, and especially its sensibility, seem to reside mainly on its surface; for slight contact, even of the vascular membranes covering the posterior columns, caused acute pain.

The first experiment of Sir C. Bell consisted in laying open the spinal canal of a living rabbit, and dividing the posterior roots of the nerves that

* *Annales de Chimie et de Physique*, tom. xxiii. p. 436.

supply the lower limbs. The animal was able to crawl. In his second trial he first stunned the rabbit, and then exposed the spinal marrow. On irritating the posterior roots, no motion was induced in any part of the muscular frame ; but on grasping the anterior roots, each touch of the forceps was followed by a corresponding contraction of the muscles supplied by the irritated nerve. Magendie has described* the following experiments, which he has since declared were made without any knowledge of the prior ones of Sir C. Bell. The subjects chosen for the operation were puppies about six weeks old ; for in these it was easy to cut with a sharp scalpel through the vertebræ and to expose the medulla. In the first the posterior roots of the lumbar and sacral nerves were divided, and the wound closed : violent pressure, and even pricking with a sharp instrument, awakened no sensation in the limb supplied by the nerves which had been cut ; but its motive power was uninjured. A second and a third trial gave the same results. Magendie then divided in another animal, though with some difficulty, the anterior roots of the same nerves on one side. The hind limb became flaccid and entirely motionless, though it preserved its sensibility. Both the anterior and posterior roots were cut in the same subject with destruction of motion and sensation. In a second paper† Magendie has related the following additional facts : The introduction of nux vomica into the animal economy is well known to give rise to violent tetanic convulsions of the whole muscular system. This property was made available as a test of the functions of the separate orders of nervous roots. It was found that, while all the other muscles of the body were agitated, when under the influence of this poison, by violent spasmodic contractions, the limb, supplied by nerves whose anterior roots had been previously divided, remained supple and motionless. But when the posterior roots only had been cut, the tetanic spasms were universal. It would seem, however, that the seats of the two faculties of conducting motion and sensation are not strictly insulated by exact anatomical lines, but that they rather pass into each other with rapidly decreasing intensity. Thus irritation of the *anterior* roots, when connected with the medulla, gives birth, along with motive phenomena, to some evidences of sensibility ; and, *vice versa*, stimuli applied to the posterior roots, also undivided, occasion slight muscular contractions. In this last case it is, indeed, probable that the irritation travelled from the posterior roots upwards to the brain in the accustomed channel, and gave rise to a perception of pain, which prompted the muscular effort. Indeed, after division of the posterior nervous roots, ordinary stimulants, applied to the ends not connected with the medulla, produced no apparent effects ; though the galvanic fluid directed upon either order of roots gave rise to

* *Journal de Physiologie*, tom. ii. p. 276. August, 1822. † *Ibid.* tom. ii. p. 366.

muscular contractions. These were more complete and energetic when the anterior roots were the subjects of the experiment.

Besides the evidence thus obtained by direct experiments on living animals, several important facts have been gathered from the pathology of the nervous system in man. These consist of cases of insulated paralysis of either motion or feeling, referred to the changes in structure observed after death. Sir Charles Bell has himself recorded several examples of this kind strongly confirming his experimental results; and others of similar tendeney are scattered through the successive volumes of Magendie's Journal.* But it must be admitted that evidence of this kind is seldom distinct and conclusive. The structural changes, induced by disease, are rarely so circumscribed in seat and extent as to represent adequately the operations of the scalpel; and often when they are thus isolated within anatomical bounding lines, they affect, by pressure, or by the spread of the same morbid process, in a degree too slight to leave decided traces, the functions of contiguous parts, thus clouding the judgments of the best pathologists, and invalidating their inferences. There is, however, a very remarkable case described by Professor Royer Collard, to which these objections do not apply. Sprevale, an invalided soldier, was upwards of seventeen years the subject of medical observation in the Maison de Sante of Charenton. This individual remained for the last seven years of his life with the legs and thighs permanently crossed, and totally incapable of *motion*, though retaining their sensibility. On opening after death the spinal canal, there was found the pultaceous softening (*ramollissement*) of the whole *anterior* part of the medulla, and of almost the whole of the fibrous cords which form it. The *anterior* roots of the spinal nerves had also lost their accustomed consistency; while the posterior surface of the spinal cord, and its investing membrane, were healthy. Several of the cases observed by Sir Charles Bell furnish also unequivocal proof of the soundness of the views developed by experiment.

There exist, indeed, few truths in physiology established on so wide and solid a basis of experimental research and pathological observation as those deduced by Sir Charles Bell, the original discoverer, and by Magendie, his successor in the path of inquiry, respecting the offices of the spinal medulla. This organ may now be regarded as mainly, if not solely, a medium of intercourse between the external world and the brain, and again between the brain and the voluntary muscles, its two anterior columns being subservient to motion, its two posterior to sensation. In the present state of our knowledge it would be fruitless to try to penetrate into the minute philosophy of these actions: but it seems probable, from re-

* See in particular Dr. Rullier's case, tom. iii. p. 173; and Dr. Koreff's, tom. iv. p. 376

cent discoveries on the ultimate anatomy of tissue, that these actions are molecular, having their place in the globular elements, into which all living textures are resolvable by microscopic analysis;—that the physical changes, *e. g.* impressed by external objects on the delicate net-work of nerve which invests the tegumentary membranes and open cavities, are propagated thence, from particle to particle, along the continuous filaments, to their origins in the posterior spinal columns, and thence to the central point, where they become objects of perception;—and that the motive stimulus of volition is similarly transmitted down the anterior columns and nerves, to the organs of locomotion. Indeed, it is a legitimate inference from Sir Charles Bell's discoveries, that a simple nervous filament, or medullary collumn, can only propagate an impression in one line of direction, viz: either towards or from the central seat of perception and of will; and this curious law of nervous actions would seem to point at some insensible molecular *motion* as their essential condition.

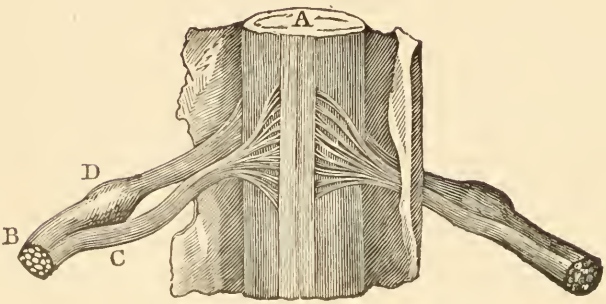
It remains to investigate the arguments which have been supposed to prove the residence in the spinal marrow of the power of originating and controlling the actions of the heart. This question has been matter of eager controversy, from its bearing upon the general relations of nerve and muscle. Without prejudging this latter topic, it may simplify its future consideration, and will at the same time be more consistent with strict arrangement, to state here merely the facts which have reference to the spinal medulla.

The work of Legallois, entitled "*Experiences sur le Principe de la Vie, notamment sur celui des Mouvemens du Cœur et sur le Siege de ce Principe*,"* was the first remarkable essay on the relations between the heart and the spinal cord. It will, however, be sufficient to allude in general terms to the conclusions of Legallois, since they have been entirely subverted by the subsequent researches of Dr. Wilson Philip and M. Flourens. Legallois's main doctrine was, that the principle which animates each part of the body resides in that part of the spinal medulla whence its nerves have their origin; and that it is also from the spinal cord that the heart derives the principle of its life and its motion†. The experimental proof supposed to establish these propositions consisted in destroying in different rabbits portions of the cervical, dorsal, and lumbar medulla. Cessation of the heart's action was affirmed to be the constant result of the operation; but even in some of Legallois's own experiments,‡ the motions of the heart continued after considerable injury had been inflicted on the spinal cord, and especially on its lower divisions. Still more unequivocal is the evidence that has been advanced by Dr. Wilson Philip, in his *Inquiry into the Laws of the Vital Functions*. His experiments, which

* *Œuvres de Legallois*, tom. i. pp. 97, 99, &c. † p. 259. ‡ pp. 100, 101, 105.

FIG. 4.

Front view of a section of the Spinal Cord, and Spinal Nerves.




A—Spinal Cord.

B—Spinal Nerve.

C—Motor branch of Spinal Nerve.

D—Ganglion of posterior branch of Spinal Nerve.

were very numerous and judiciously varied, show that the circulation continues long after entire removal of the spinal marrow, and that by artificially maintaining respiration, the motions of the heart may be almost indefinitely prolonged. Flourens in the 10th vol. of the *Mem. de l'Academie*,* has lately confirmed Dr. Philip's views: he has shown that the circulation is entirely independent of the spinal marrow. The influence apparently exerted is only secondary, being due to the suspension of the respiratory movements. Thus all those portions of the spinal marrow which can be destroyed in the different classes of animals without arresting respiration, may be removed without affecting the circulation. In fishes and frogs the entire spinal cord may be destroyed without checking the heart's motions, because in these classes the medulla oblongata presides exclusively over the respiratory function.

## NERVES.

The classification of nerves, which is most convenient to the physiologist, is based upon their vital properties or functions. Such an arrangement would distribute them into—1, nerves of motion; 2, nerves both of motion and sensation; 3, the nerves ministering to the senses of sight, smell, and hearing; and 4, the ganglionic system, or, according to Bichat, nerves of organic life. Sir Charles Bell has added a fifth class, comprising nerves which he supposes are dedicated to the respiratory motions. But it will afterwards appear that the existence of an exclusive system of respiratory nerves is not supported by sufficient evidence.

The first class of nerves exercising the single office of conveying motion comprehends the 3rd, 4th, 6th, portio dura of the 7th, the 9th, and perhaps two divisions of the 8th, viz: the glossopharyngeal and spinal accessory. Mr H. Mayo's experiments, detailed in his *Anatomical and Physiological Commentaries*, No. 11, (and *Journal de Physique*, tom. iii.) throw much light on the functions of several of these nerves. The motions of the iris, he shows, require the integrity of the third pair, division of these nerves being always followed by full dilatation of the pupils, which cease to be obedient to the stimulus of light. If the divided end of the nerve, communicating with the eye, be pinched by the forceps, the iris contracts. Hence it is apparent that diminution of the aperture of the pupil is the result of action, and dilatation of the pupil the result of relaxation of the iris. Flourens has shown that complete extirpation of the tubercula quadrigemina also paralyses the iris, and that irritation of those bodies excites its contractions. The same effect is noticed by Mayo to

* p. 625.

arise from division or irritation of the optic nerve. He divided the optic nerves within the cranium of a pigeon immediately after decapitation When the end of the nerve connected with the ball of the eye was seized in the forceps, no action ensued ; but when the end attached to the brain was irritated, the iris immediately contracted. These several experiments clearly indicate the dependence of the iris upon the optic nerve, upon the tubercula from which one root of that nerve springs, and upon the third pair. The stimulus of light impinges upon the retina, is conveyed along the optic nerve through the tubercle to the sensorium, whence the motive impression is propagated to the iris by the third encephalic nerve.

It is not so easy to define the precise mode of action of the pathetici, or fourth pair of nerves. Sir Charles Bell* supposes that they are destined "to provide for the insensible and instinctive rolling of the eyeball, and to associate this motion of the eyeball with the winking motions of the eyelids." He even conjectures that "the influence of the fourth nerve is, on certain occasions, to cause a relaxation of the muscle to which it goes." It is certain, however, from its exclusive distribution to the superior oblique muscle, that the fourth is a nerve of motion. The sixth nerve is also a nerve of voluntary motion, and is sent to the rectus externus of the eyeball.

Sir Charles Bell has placed the portio dura of the seventh pair among his respiratory nerves. There is, however, no doubt that it is simply a motive nerve, and that it is indeed the only nerve of motion which supplies all the muscles of the face, except those of the lower jaw and palate. Division of this nerve occasions no expression of pain, according to Bell; but Mayo's experience is opposed to this absence of sensibility.† "The motion of the nostril of the same side instantly ceased, after its section in an ass,‡ and that side of the face remained at rest and placid during the highest excitement of the other parts of the respiratory organs." These and similar observations are all consistent with the opinion that the seventh is simply a nerve of voluntary motion. It will afterwards appear that it has no claim to any further endowment.

Mr. Herbert Mayo infers from his experiments, that the three divisions of the eighth pair are all nerves both of motion and sensation. Thus the glossopharyngeus is a nerve of motion to the pharynx, and perhaps of sensibility to the tongue. He observed that "on irritating the glossopharyngeal nerve in an animal recently killed, the muscular fibres about the pharynx acted, but not those of the tongue."§ Irritation of the spinal

* *Natural System of Nerves*, p. 358.

† See Mr. H. Mayo's *Anatomical and Physiological Commentaries*, Part I.; and *Outlines of Human Physiology*, 2nd edit., p. 334. ‡ pp. 105, 107

§ *Outlines of Human Physiology*, 2nd edit., p. 337.

acccessory produced both muscular contractions and pain. The par vagum, he conceives, bestows sensibility on the membrane of the larynx, besides conveying the motive stimulus to its muscles. This nerve has been the subject of experiment from the earliest times, and Legallois has minutely described the results obtained by successive inquirers.* These were singularly discordant, and gave origin to the most opposite theories of the mode of action of the par vagum. In the greater number of experiments, section of this nerve was followed, after a longer or shorter interval, by death. Piccolhomini contended that the division of the nerve was fatal from its arresting the movements of the heart, and after him Willis supported the same doctrine. By Haller, on the contrary, the cause of death was sought in disturbance of the digestive functions. Bichat and Dupuytren seem to have been the first to obtain a glimpse of the true seat of injury. The former remarked that the respiration became very laborious after section of the nerve, and Dupuytren distinctly traced death to asphyxia. Legallois has established by numerous experiments the accuracy of this last view. He has shown that in very young animals death is the immediate consequence of the operation of cutting either the par vagum or its recurrent branch, and that the suddenness of the effect is due to the narrowness of the aperture of the glottis in early age. In adult animals, the asphyxia is induced by the effusion of serous fluids and ropy discolored mucus into the bronchial tubes and air-cells. More recently, Dr. Wilson Philip has practised the section of the par vagum with an especial reference to its influence upon digestion. He divided the nerve below the origin of the inferior laryngeal branch, as in this case the dyspnœa is much less considerable than when the wound is inflicted on the higher portion.† It was found, in all these trials, that food introduced into the stomach after the operation remained wholly undigested. Hence Dr. Philip infers the dependence of secretion upon nervous influence, a conclusion, it has been remarked by Dr. Alison, not logically deducible from the experimental data.‡

The par vagum cannot then, it is obvious, be included in the class of nerves subservient solely to motion; and it is even doubtful whether the other two divisions of the eighth pair are not also endowed with sensibility. Respecting the function of the ninth, or lingual, there is, however, no place for hesitation. It has been experimentally proved by Mr. Mayo to supply the muscles of the tongue; though he also asserts that pinching it with the forceps excited pain. Three of these nerves, the third, sixth, and ninth, arise, it was first remarked by Sir Charles Bell, from a tract of medullary matter continuous with the anterior column of

* *Œuvres*, p. 154, *et seq.* † *Experimental Inquiry*, 3rd edit., p. 109.
‡ Dr. Alison, *Journal of Science*, vol. ix. p. 106.

the spinal marrow; and hence their exclusive office of conducting motive impressions.

II. There are thirty-two pairs of nerves of similar anatomical origin and composition, which possess the twofold office of communicating motion and sensation. Of these, all excepting one (the fifth pair of the cerebrel nerves) spring from the spinal marrow. These thirty-one pairs are precisely analogous in formation, being all constituted of two distinct series of roots, one from the anterior column, and one from the posterior column of the spinal marrow. The posterior funiculi collected together form a ganglion, seated just before this root is joined by the anterior root. It has been already stated that the power of propagating sensation resides in the posterior column, and in the nervous roots arising from it, and that the motive faculty has its seat in the anterior column and roots. The evidence, also, supplied by Bell and Magendie, that the spinal nerves are hence nerves of double office, has been fully detailed. It remains, then, to establish the title of the fifth pair of cerebral nerves to be included in the same class with the spinal nerves.

The analogy in structure and mode of origin between the fifth pair and the nerves of the spine has been long matter of observation. Prochaska has thus distinctly noticed it in a passage of his Essay *De Structura Nervorum*, published in 1779, first pointed out to me by my friend Dr. Holme: "Quare omnium cerebri nervorum, solum quintum par post ortum suum more nervorum spinalium, ganglion semilunare dictum, facere debet? sub quo peculiaris funiculorum fasciculus ad tertium quinti paris ramum, maxillarem inferiorem dictum, properat, insalutato ganglio semilunari, ad similitudinem radicum anteriorum nervorum spinalium?" Sommerring has also pointed out with equal clearness the resemblance in distribution between the smaller root of the fifth and the anterior roots of the spinal nerves. But Sir Charles Bell was the first to establish the identity of their functions, and to arrange them prominently in the same natural division. His experiment consisted in exposing the fifth pair at its root, in an ass, the moment the animal was killed. "On irritating the nerve, the muscles of the jaw acted, and the jaw was closed with a snap. On dividing the root of the nerve in a living animal, the jaw fell relaxed." In another experiment the superior maxillary branch of the fifth nerve was exposed. "Touching this nerve gave accute pain;.....the side of the lip was observed to hang low, and it was dragged to the other side." Sir Charles Bell concluded that the fifth nerve and its branches are endowed with the attributes of motion and sensation. This, though correct as regards the nerve itself, viewed as a whole, is strictly true only of the lowest of its three *divisions*, viz: the inferior maxillary. The ophthalmic and the superior maxillary, the subject of the last experiment, are nerves simply of sensation. Mr Herbert Mayo in the Essay already referred to, has

pointed out this error, and has defined with minute precision the relative offices of the fifth and seventh nerves. By a careful dissection of the fifth nerve he found that the anterior branch, or smaller root, which goes, as Prochaska was aware, entirely to the inferior maxillary, is distributed exclusively to the circumflexus palati, the pterygoids, and temporal and masseter *muscles*. He observed that section of the supra and infra orbitar branches, and of the inferior maxillary, near the foramina, whence they emerge, induces loss of sensation in the corresponding parts of the face. It may then be regarded as fully proved that the trigeminus, or fifth pair, is the nerve which bestows sensation on the face and its appendages, and motion only on the muscles connected with the lower jaw. The other muscles of the face derive their motive power from the portio dura of the seventh nerve.

M. Magendie has also published several memoirs on the functions of the fifth pair. In these he attempts to prove that the olfactory nerve is not the nerve of smell; that the optic is but partially the nerve of vision; and that the auditory is not the principal nerve of hearing. It is in the fifth pair that he supposes all these distinct and special endowments to reside. But the experimental proof will be found to be singularly inconclusive. The olfactory nerves were entirely destroyed in a dog. After the operation it continued sensible to strong odours, as of ammonia, acetic acid, or essential oil of lavender; and the introduction of a probe into the nasal cavity excited the same motions and pain as in an unmutilated dog. The fifth pair was then divided in several young animals, the olfactory being left entire. All signs of the perception of strongly odorous substances, as sneezing, rubbing the nose, or turning away the head, entirely disappeared. From these facts Magendie infers that the seat of the sensations of smell is in the fifth, and not in the first pair of nerves. It is obvious that Magendie has confounded two modes of sensation, which are essentially distinct in their nature and in their organic seat, viz: the true perceptions of smell, and the common sensibility of the nasal passages. The phenomena, which he observed to cease after the section of the fifth nerve, are the results of simple irritation of the pituitary membrane, and are manifestly wholly unconnected with the sense of smelling, since they are producible by all powerful chemical agents, even though *inodorous*, as, for example, by sulphuric acid. No proof has been given that the true olfactory perceptions do not survive the destruction of the fifth pair. Indeed, in a subsequent paper, Magendie confesses that the loss of sensibility in the nasal membrane, after section of the fifth, does not prove the residence of the sense of smell in the branches of that nerve; but merely that the olfactory nerve requires, for its perfect action, the cooperation of the fifth pair, and that it possesses only a special sensibility to odorous particles.

There is even less ground for supposing that the fifth pair is in any degree subservient to the senses of sight and hearing. After cutting this nerve on one side, the flame of a torch was suddenly brought near the eye, without inducing contraction of the pupil; but the direct light of the sun caused the animal to close its eyelids. Thus the sensibility of the retina, though somewhat impaired, was not destroyed by division of the fifth pair. But section of the optic nerves was immediately followed by total blindness. In another rabbit Magendie divided the fifth pair on one side, and the optic nerve on the other. The animal, he states, was completely deprived of sight, though the eye, in which the fifth pair only had been cut, remained susceptible to the action of the solar rays. No evidence, however, is offered to show that the animal was entirely blind; on the contrary, the only change observed, on approaching a torch to an *uninjured* eye, was contraction of the iris; and this we are told was actually observed in the eye of the side, on which the fifth nerve had been divided.

Magendie has assigned another singular function to the fifth pair, viz: to preside over the nutrition of the eye. Twenty-four hours after section of this nerve, incipient opacity of the cornea was observed, which gradually increased till the cornea became as white as alabaster. There was also great vascularity of the conjunctiva extending to the iris, with secretion of pus, and formation of false membranes in the anterior chamber. About the eighth day, the cornea began to detach itself from the sclerotica, the centre ulcerated, and the humours of the eye finally escaped, leaving only a small tubercle in the orbit. In this experiment, the nerve had been divided in the temporal fossa, but when cut immediately after leaving the pons Varolii, the morbid changes were less marked, the movements of the globe of the eye were preserved, the inflammation was limited to the superior part of the eye, and the opacity occupied only a small segment of the circumference of the cornea. After division of the nerve near its origin in the medulla, no traces of disease were discoverable in the eye till the seventh day, and these symptoms never became very prominent. Several cases have been since recorded of structural disease of this nerve in the human subject, with the concomitant symptoms. That of Laine, described by Serres in the 4th vol. of Magendie's *Journal*, furnishes strong support to the views of Magendie.*

A different explanation of this fact and of others, which have a tendency to refer secretion and nutrition to the control of the nervous system, has been proposed by Dr. Alison. Mucous surfaces are protected from the contact of air and foreign bodies by a copious secretion, which is evidently regulated in amount by their sensibility, since it is increased by any un-

* See also a case of destruction of the olfactory nerves, tom. v.

usual irritation. This is especially true of the membrane of the eye. Now section of the fifth pair is known to paralyse the sensibility of that organ, and the contact of air or other irritating body upon the *insensible* membrane, instead of inducing an augmented mucous discharge, will excite the inflammatory process described by Magendie. The disorder of the digestive function,* which followed division of the par vagum in the experiments of Dr. Wilson Philip, and the ulceration of the coats of the bladder after injury of the lower part of the spinal marrow, are attributed by Dr. Alison to the same cause.

The class of nerves which comprehends the fifth pair and the thirty-one pairs of spinal nerves, becomes, after the union of their roots, invested with a twofold endowment, and continues so throughout their entire course and final distribution to the muscular tissue. It would appear, indeed, from a later paper of Sir Charles Bell,† that nerves of sensation, as well as of motion, are necessary to the perfect action of the voluntary muscles. "Between the brain and the muscles there is a circle of nerves; one nerve conveys the influence from the brain to the muscle, another gives the sense of the condition of the muscle to the brain." In the case of the spinal nerves this circle of intercourse is at least probable; but proof of its necessity must be obtained, from observing the habitudes of those encephalic nerves, which minister exclusively to motion. Now it is found, on minute dissection, that the muscles of the eyeball, which are supplied by the third, fourth, and sixth motive nerves, also receive sensitive filaments from the ophthalmic branch of the fifth; and that the muscles of the face, to which the portio dura is distributed, are also furnished with branches of sensation from the fifth. Sir Charles Bell has further shown that the muscles of the lower jaw, to which the motive impression is propagated by the muscular branch of the inferior maxillary, draw nervous supplies also from the ganglionic or sensitive branch of that division of the fifth pair. This complicated provision has its origin, he supposes, in its being "necessary to the governance of the muscular frame that there should be consciousness of the state or degree of action of the muscles."

III. The olfactory, auditory, and optic nerves are gifted with a special sensibility to the objects of the external senses, to which they respectively minister. Magendie seems to have been the first to prove, experimentally, that they do not also share the common or tactile sensibility. He exposed the olfactory nerves, and found that, like the hemispheres of the brain from which they spring, that they are insensible to pressure, pricking, or even laceration. Strong ammonia was dropped upon them without eliciting any signs of feeling. The optic nerve, and its expansion on the retina, participate with the olfactory in this insensibility to

* *Outlines of Physiology*, p. 71. † *Philosophical Transactions*, 1826, p. 163.

stimulants. This was proved by Magendie in the human subject as well as in animals. In performing the operation of depressing the opaque lens, he repeatedly touched the retina in two different individuals without awakening the slightest sensation. The portio mollis, or acoustic nerve, was also touched, pressed, and even torn without causing pain.

IV. The functions of the ganglia, of the great sympathetic nerve, and its intricate plexuses and anastomotic connexions, are matter, at present, of conjecture. Dr. Johnstone, in an Essay on the Use of the Ganglions, published in 1771, has described a few inconclusive experiments on the cardiac nerves. He supposes that "ganglions are the instruments by which the motions of the heart and intestines are rendered uniformly involuntary,"—a notion which Sir Charles Bell has shown to be totally unsound. The best history of opinions, to which indeed our knowledge reduces itself, will be found in the physiological section of Lobstein's work, *De Nervi Sympathetici Fabrica, Usu, et Morbis.**

In the earliest of his communications to the Royal Society, as well as in his last work on the Nervous System,† Sir Charles Bell has maintained the existence of a separate class of nerves, subservient to the regular and the associated actions of respiration. The origins of these nerves‡ "are in a line or series, and from a distinct column of the spinal marrow. Behind the corpus olivare, and anterior to that process, which descends from the cerebellum, called sometimes the corpus restiforme, a convex strip of medullary matter may be observed. From this tract of medullary matter, on the side of the medulla oblongata, arise, in succession, from above downwards, the portio dura of the seventh nerve, the glossopharyngeus nerve, the nerve of the par vagum, the nervus ad par vagum accessorius, and, as I imagine, the phrenic and the external respiratory nerves." The fourth pair is also received into the same class.

This doctrine of an exclusive system of respiratory nerves, associated in function by virtue of an anatomical relation of their roots, has not, as Sir Charles Bell seems himself aware,§ received the concurrence of many intelligent physiologists of this country or of the Continent. Mr. Herbert Mayo, in the admirable Essay already referred to, was the first to point out the true relations of the fifth and seventh nerves. He has shown that the muscles of the face, excepting those already enumerated, which elevate the lower jaw, receive their motive nerves exclusively from the seventh, and consequently that this nerve must govern *all* their motions, voluntary as well as respiratory. But Dr. Alison in his very elaborate paper|| "On the Physiological Principle of Sympathy," has cast

* Paris, 1823. † 4to. 1830.

‡ *The Nervous System of the Human Body*, p. 129, 4to, 1830.

§ *Op. cit.*, p. 115.

|| *Transactions of the Medico-Chirurgical Society of Edinburgh*, 1826, vol. ii. p. 165.

considerable doubts on the soundness of this part of Sir Charles Bell's arrangement, as respects not only the individual nerves thus classed together, but even the general principle on which the entire system rests. The reasoning of Dr. Alison consists, first, in referring the phenomena of natural and excited respiration to the comprehensive order of sympathetic actions. In these "the phenomenon observed is, that on an irritation or stimulus being applied to one part of the body, the voluntary muscles of another, and often distant part, are thrown into action." Now it has been long since fully established by Dr. Whytt, that these associations in function cannot be referred to any connexions, either in *origin* or in course, of the nerves supplying remote organs so sympathizing; and that a *sensation* is the necessary antecedent of the resulting muscular action. Thus it is known that these actions cease in the state of coma; are not excited when the mind is strongly impressed by any other sensation or thought; and that the same muscular contractions may be induced by the irritation of different parts of the body, provided the same sensation be excited. Dr. Alison has, however, failed to show* that the essential acts of inspiration, viz: the contractions of the diaphragm and intercostals, require the intervention of a sensation. Their continuance in the state of coma, and in the experiments of Legallois and Flourens after the entire removal of the brain, and their distinct reference by these two inquirers to the medulla oblongata, which has never been supposed to be the seat of sensation, prove them to be independent of the will and of perception. But this is true only of the essential, not of the associated respiratory phenomena.

Dr. Alison proceeds to show that there is equal reason for classing almost all the nerves of the brain, and many more of the spinal nerves, with those exclusively named respiratory by Sir Charles Bell. Thus the lingual nerve governs an infinite number of motions strictly associated with respiration: the inferior maxillary "moves the muscles of the lower jaw in the action of sucking,—an action clearly instinctive when first performed by the infant, frequently repeated voluntarily during life, and always in connexion with the act of respiration." Again, the sensitive branches of the fifth pair cooperate in the act of sneezing. But if these nerves be admitted into the system, the fundamental principle of that system, viz: origin in a line or series, is at once violated. Nor is this connexion in origin more than matter of conjecture, as regards two of the most important of the nerves, classed by Sir Charles Bell himself as respiratory,—the phrenic and the external respiratory. These two nerves branch from the cervical or regular double-rooted series. Moreover, the circumstance of rising in linear succession is not found to associate nerves in function. "Between the roots of the phrenic nerve and those of the intercostals, there

* p. 176, and note.

intervene in the same series the origins of the three lowest cervical nerves, and the first dorsal, which go chiefly to the axillary plexus and to the arm, and which are not respiratory nerves."

In recapitulation, the following facts are among the most important that have been fully ascertained in the physiology of the nervous system:

1. One universal type has been followed in the formation of the nervous system in vertebrated animals. The brain of the human fœtus is gradually evolved in the successive months of uterine existence; and these stages of progressive developement strictly correspond with permanent states of the adult brain at inferior degrees of the animal scale.

2. These successive increments of cerebral matter are found to be accompanied by parallel advances in the manifestation of the higher instincts and of the mental faculties.

3. That the brain is the material organ of all intellectual states and operations, is proved by observation on comparative developement, as well as by experiments on living animals, and by the study of human pathology. But there does not exist any conclusive evidence for referring separate faculties, or moral affections, to distinct portions of brain.

4. Certain irregular movements are produced by injuries of the corpora striata, thalami optici, crura cerebelli, and semi-circular canals of the internal ear.

5. The tubercula quadrigemina preside over the motions of the iris, and their integrity seems essential even to the functions of the retina. They are also, according to Flourens, the points, at which irritation first begins to excite pain and muscular contractions.

6. The cerebellum appears to exercise some degree of control over the instruments of locomotion; but the precise nature and amount of this influence cannot be distinctly defined.

7. The cerebrum, cerebellum, and medulla oblongata possess the faculty of acting primordially, or spontaneously, without requiring foreign excitation. The spinal cord and the nerves are not endowed with spontaneity of action, and are therefore termed subordinate parts.

8. The medulla oblongata exercises the office of originating and regulating the motions essential to the act of respiration. By virtue of its continuity with the spinal marrow, it also participates in the functions of that division of nervous matter.

9 The function of the spinal cord is simply that of a *conductor* of motive impulses, from the brain to the nerves supplying the muscles, and of sensitive impressions from the surface of the body to the sensorium commune. These two vital offices reside in distinct portions of the spinal medulla,—the progagation of motion in its anterior columns, the transmission of sensations in its posterior columns. There is no necessary dependence

of the motions of the heart, and the other involuntary muscles, on the spinal marrow.

10. The nerves are comprehended in the four following classes:— I. Nerves simply of motion; II. Of motion and sensation; III. Of three of the senses; IV. The ganglionic system.

I. The nerves of motion are the third, fourth, sixth, portio dura of the seventh, and the ninth. It is not ascertained whether the glossopharyngeal and spinal accessory nerves belong to this or to the second class.

II. The function of ministering both to motion and sensation is possessed by the fifth pair of cerebral nerves, and by the spinal nerves, which agree precisely in anatomical composition. The par vagum, however, which is one of the irregular nerves, has also a twofold endowment.

III. This division comprises the first and second pairs, and the portio mollis of the seventh pair. These nerves are insensible to ordinary stimulants, and possess an exclusive sensibility to their respective objects, viz: odorous matter, light, and ærial undulations.

IV. The system of the great sympathetic nerve, and its associated plexuses and ganglia.

## CHAPTER II.

### VIEWS OF THE STRUCTURE OF THE BRAIN.

FIGURE 5,

Represents the base of the brain and the cerebellum.

AB } Are the right and left hemispheres of the brain.
AB }

FF, The cerebellum.

AA, The anterior lobe.

e e, The line which denotes the separation between the anterior lobe and the middle lobe.

DD, The middle lobe.

BB, The posterior lobe.

e, The *pons Varolii*, which brings the two sides of the cerebellum into communication. It is also named the *Tuber annulare*.

f, The *Medulla oblongata*.

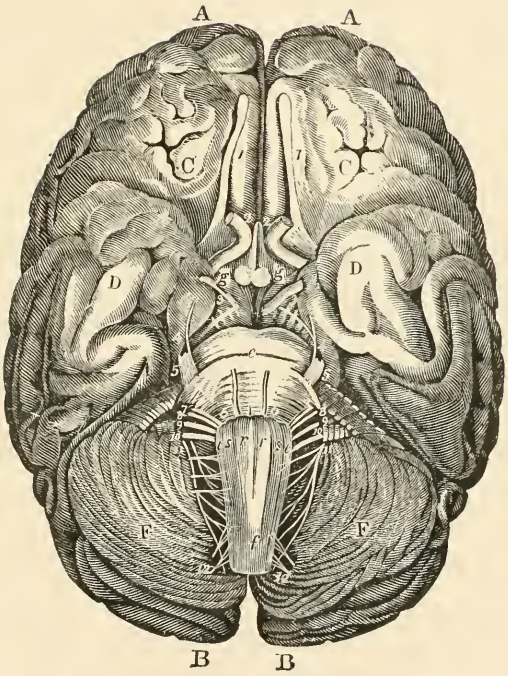
r r, The *Corpora pyramidalia*.

s s, The *Corpora olivaria*.

t t, The *Corpora restiformia* are on the opposite side of the Corpora pyramidalia.

1. First pair, or olfactory nerves, arise by three origins. These unite and proceed forwards and inwards in a groove in the inferior surface of the anterior lobes of the brain, and form a greyish swelling or ganglion. From this ganglion a great number of filaments proceed through the cribriform plate of the ethmoid bone, and are distributed upon the mucous membrane of the nose. It is the nerve of the sense of smell.
2. Second pair, or optic, arise principally from the anterior *corpora quadrigemina*. Each nerve passes outwards through the optic foramen in the sphenoid bone, and is expanded upon the retina. It is the nerve of the sense of sight.
3. Third pair, or *motores oculorum*, originate from the motor tract of the spinal cord, immediately after they have passed through the *pons Varolii*. Each nerve escapes through the sphenoidal fissure, and supplies five of the muscles within the orbit with motor filaments.
4. Fourth pair, or *trochleares*, originate from the *processus e cerebello ad testes* and *valvula* of Vieussens. Each nerve passes out from the cranium at the sphenoidal fissure, and is entirely distributed upon the superior oblique muscles of the eyeball. It is a motor nerve.

FIG. 5.



5 Fifth pair. These nerves issue from the surface of the brain, near the junction of the *pons Varolii* and *crus cerebelli*, but actually arise from the restiform bodies. Each nerve escapes from the cranium by three separate openings, and is extensively distributed upon the orbit and other parts of the face. Part of the filaments of this nerve are *sensitive*, and part *motor*.

6. Sixth pair originate from the pyramidal bodies, as they are about to enter the *pons Varolii*. Each nerve escapes through the sphenoidal fissure, and is entirely distributed upon the external rectus muscle of the eyeball. It is a motor nerve.

7. *Portio dura* of the seventh pair originate from the restiform bodies. Each nerve is extensively distributed in the muscles of the face and external ear. It is the motor nerve of the muscles of expression of the face.

8. *Portio mollis* of the seventh pair, or auditory nerves, (eighth pair of some authors,) arise principally from a small grey swelling on the upper surface of the restiform bodies at the side of the fourth ventricle. Each nerve is distributed upon the internal ear, and is the nerve of the sense of hearing.

9. Glossopharyngeal nerves, or upper division of the eighth pair, (ninth pair of some authors,) arise from the restiform bodies near the sulcus which separates them from the olivary, and are distributed upon the pharynx and mucous membrane at the back part of the tongue. It is a sensitive nerve.

10. *Par vagum*, or pneumogastric nerves, or principal division of the eighth pair, (tenth pair of some authors,) originate in the same line with, and close upon, the glossopharyngeal. These nerves are extensively distributed upon the larynx, pharynx, trachea, œsophagus, heart, lungs, and stomach. Part of the filaments of this nerve are sensitive, and part are motor.

11. Spinal accessory nerves, or lower division of the eighth pair, (eleventh pair of some authors,) originate from the upper part of the spinal chord, in the same line with the two preceding nerves. They enter the cranium by the foramen magnum, and pass out again from the cranium through the foramen lacerum, along with the other two divisions of the eighth pair. It is principally, if not entirely, a motor nerve.

12. Hypoglossal or ninth pair (twelfth pair of some authors). Each originates from the sulcus between the pyramidal and olivary bodies, and escapes from the base of the cranium through the anterior condyloid foramen, and is distributed upon the muscles of the tongue. It is the motor nerve of the tongue.

FIGURE 6.

The right hemisphere of the brain cut through the corpus callosum, pons Varolii, medulla oblongata, and cerebellum.

MM, Convolutions, flat—color, redish grey.

A, Medulla oblongata cut through the median line. Color, outer portion bluish white—inner portion, redish grey.

a, Pyramidle body.

B, Pons Varolii, or tuber annulare. Color, white outside—inside, redish grey.

c, Tubercula quadrigemina.

D, Crus cerebri.

E, The great inferior ganglion—posterior striated body, (thalamus)—color, bluish white.

F, The great superior ganglion—anterior striated body—color, redish grey.

G, Annular ganglion.

H, Corpus callosum—color, bluish white

K, Fissura Silvii.

L, The cerebellum.

e, The arbor vitæ—color, white, in the redish grey ground of the incised cerebellum.

T, The tentorum, seperating the cerebellum from the brain.

n, Locus niger.

FIG. 6.


FIG. 7.

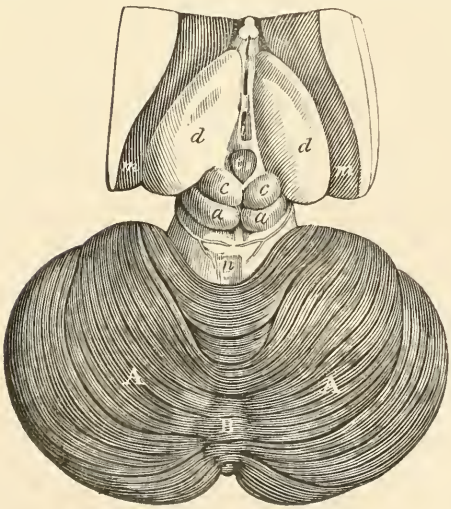


FIGURE 7.

The cerebellum, and its connection with the brain or cerebrum.

AA, The cerebellum—color, redish grey.

B, Processus vermiculares.

n, Processus e cerebello ad testes—semi-transparent—color, bluish white.

a a, The posterior corpora quadrigemina—color, bluish white.

c c, The anterior corpora quadrigemina—color, bluish white.

dd, The great inferior ganglions—posterior striated bodies (thalamus)—color, bluish white.

m m, Posterior part of the great superior ganglions—anterior striated bodies—color, redish grey.

e, Pineal gland—color, redish grey.

i, Third ventricle.

FIGURE 8.

A horizontal section of the brain at a depth of about an inch from its base, or under surface.

e e, Convolutions, or cortical part of the brain—color, redish grey.

u, Fourth ventricle.

v, Posterior commissure—color, white.

s, Third ventricle, or separation between the great ganglions.

dd, Great inferior ganglions—color, bluish white.

x, Middle commissure.

n, Anterior commissure.

pp, Great superior ganglions—striated—color, redish grey.

t, Anterior opening into the lateral ventricles.

FIG. 8.

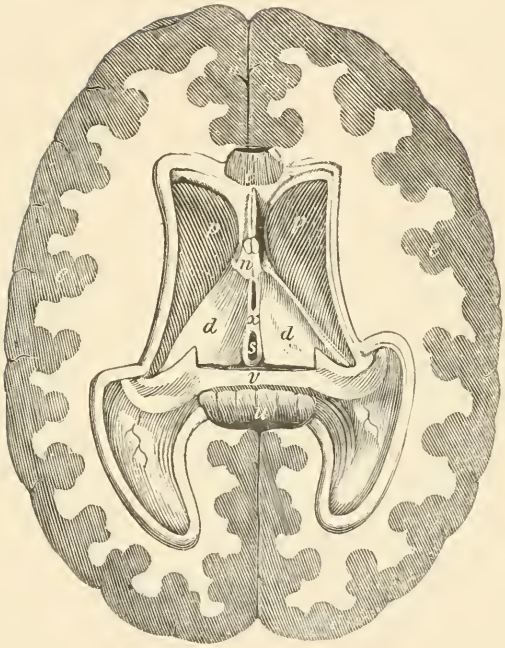


FIG. 9.

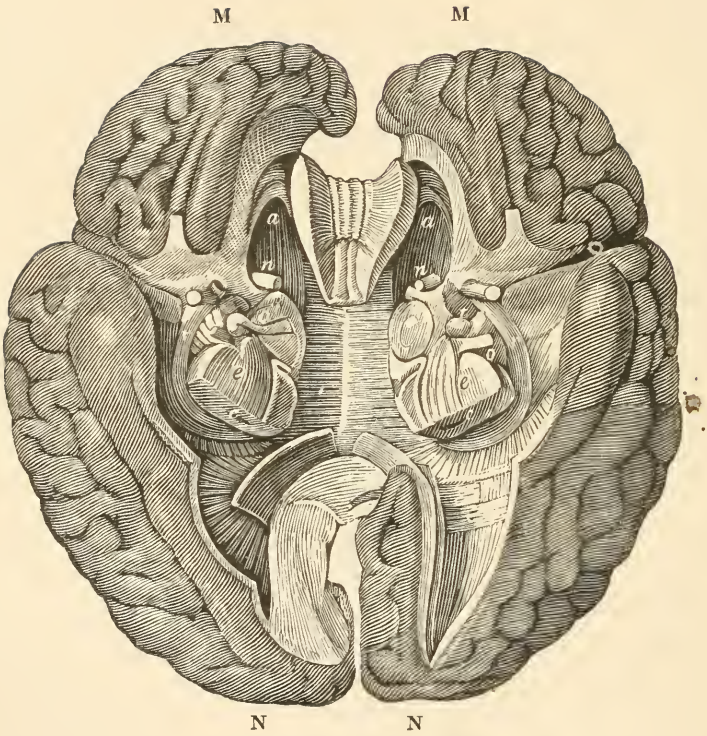


FIGURE 9.

The cerebellum, medulla oblongata, and pons Varolii removed, the brain then cut along the median line and laid open, to show its ventricles and their fibrous structure.

MM, The anterior part of the brain.

NN, Posterior part of the brain.

e e, Vertical sections of the great inferior ganglions—color, bluish white.

c c, The black substance in the centre of the great inferier ganglions.

o o, The cords of the mammary bodies which plunge into the interior of the great inferior ganglions.

t, Mammary body of the right side, the left being cut away.

r r, Optic nerves.

n n, Olfactory nerves.

a a, Great superior ganglions—color, redish grey.

## Figure 10,

Exhibits various parts about the base of the brain, with the decussation of the fibres of the pyramidal bodies.

r, Medulla oblongata.

c c, Decussation of the fibres of the pyramidal bodies, which explains the influence of the lateral cerebral parts of the brain upon the opposite sides of the body. These fibres cross the mesial line of the body one above another from below upwards like plaited straw. Those of the right side come from the left pyramidal body, and those of the left side from the right pyramidal body, and is a constant peculiarity, modified only by the number of the decussating fibres. They are contracted in their course in passing the olivary bodies a a, and then diverge as seen in the figure.

m, Auditory nerve.

n, Facial nerve. The primary bundle of fibres of the cerebellum are here seen to plunge into it between these nerves.

b, Part of the annular protuberance, or pons Varolii, plunging into the cerebellum.

s, Cerebellar ganglion.

p, Mammary bodies, with the diverging cords to which they are attached.

u, Optic nerve. "The optic nerves decussate partially, and is the cause why the eye is frequently deranged on the same side as that on which the brain is diseased."—*Spurzheim.*

h h, "Nervous fibres that expand in the convolutions and contribute to their formation."—*Spurzheim.*

i i, Olfactory nerves.

v, Side of the great lateral ventricle.

34, 35, 36, 37, 38, The fibres which pass through the great cerebral ganglions, and ultimately expand into the convolutions of the brain.

DD, Converging convolutions.

FIG. 10

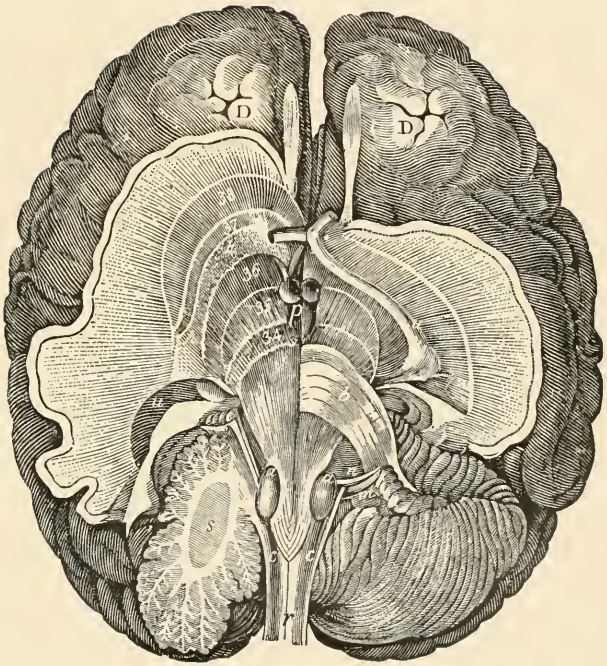
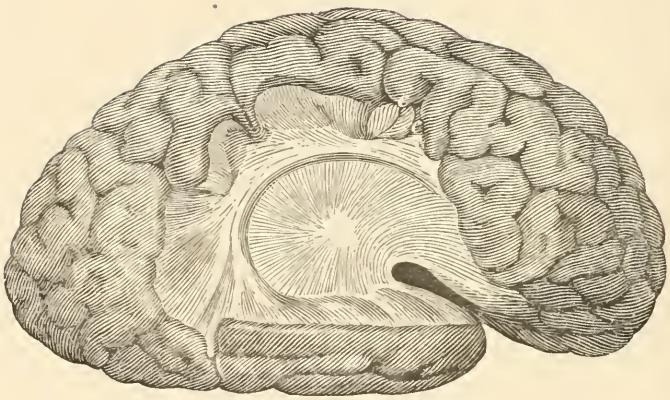


FIG. 11.



c—Internal structure of the convolutions. See p. 52.

e—Fibres of the convolutions agglutinated by a very delicate neurilema.

FIGURE 11,

Represents the right hemisphere of the brain, in which the convolutions are cut away to the depth of about three-quarters of an inch to show the fibres radiating from the centre of the outer surface of the great inferior ganglion into the convolutions.

The white spot in the centre of the figure represents the outer surface of the great inferior ganglion over which the fibres are drawn with great accuracy from the original.

FIGURE 12,

Is a fine view of a vertical section of the brain through the convolutions, the white substance, the great inferior ganglion, and the cerebellum.

This section is made through the ganglion to the depth of about the quarter of an inch from its outer surface, and through the middle of the cerebellar ganglion.

*o*, Great inferior ganglion.

m, Fibres radiating from the surface of the ganglion.

1, Cerebellar ganglion (corpus dentatum).

n, Arbor vitæ.

Some of the principal organs formed by the convolutions of the brain are numbered thus :

n, Amativeness, or sexual love.

2, Philoprogenitiveness, or love of offspring.

3, Inhabitiveness, or attachment to home.

4, Concentrativeness, or power of mental concentration.

5, Approbativeness, or love of approbation.

6, Self-esteem.

7, Firmness.

8, Reverence.

9, Benevolence.

10, Imitation.

11, Comparison, or power of comparing one thing with another.

12, Eventuality, or power of observing action.

13, Individuality, or power of observing existence.

14, Language, or power of learning or using verbal signs.

FIG. 12.

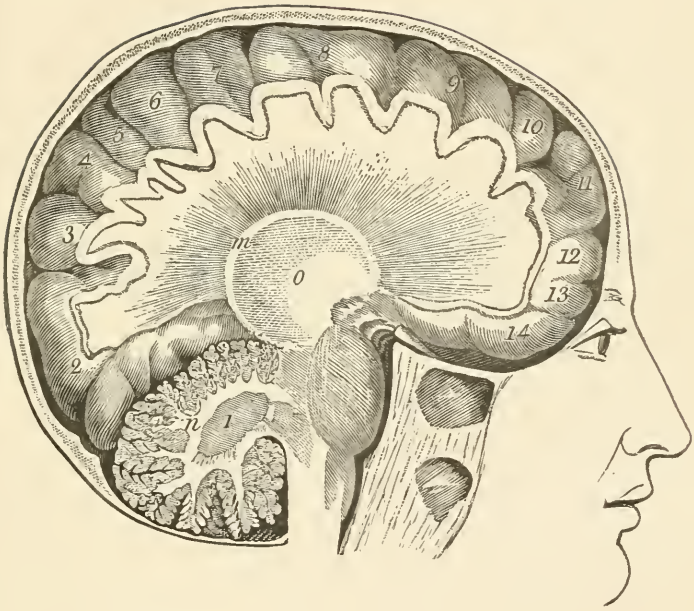
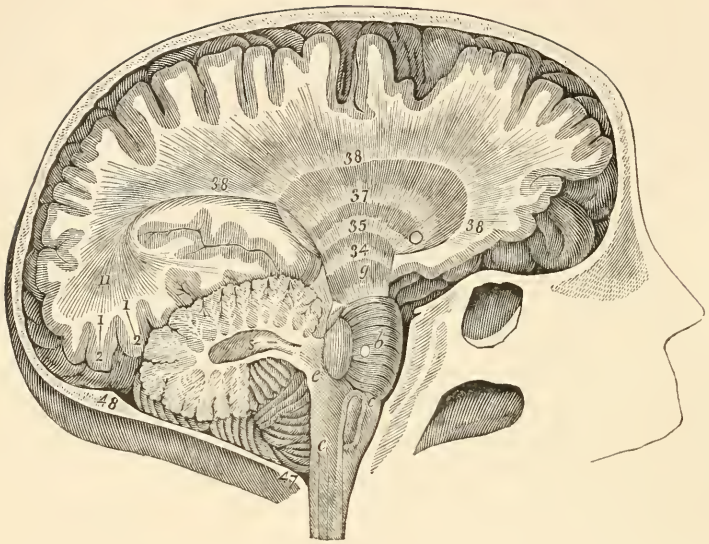


FIG. 13.



## Figure 13,

A perpendicular section of the brain, not far from the mesial line.

The fibres of the white or medullary substance radiate as seen in the figure from the base of the brain into the convolutions, the folds of which are plunged into the white substance, generally from a line to an inch deep.

e e, Is a section of one of the *corpora restiforma.*

c, Is a section of one of the *corpora pyramidalia.*

b, Is the *pons Varolii.*

*g*, Is one of the *crura* of the brain.

s, Is the cerebellar ganglion, surrounded by the arbor vitæ.

34, 35, 37, 38 and 11, Are the cerebral fibres, which, originating in the *medulla oblongata*, pass under the *pons Varolii*, through the *crura*, and *corpora striata*, and great *inferior ganglions*, and ultimately expand into the convolutions of the brain.

47, 48, Situation of the cerebellum within the skull.

These crura contain cineriterous matter in their interior, from which additional fibres are continually sent off as they advance to join and strengthen those that have come from below.

The cerebral crura are besides divided into two parts, viz: an anterior and external, and a posterior and internal mass, the limits of which are marked by two superficial furrows. They are the roots of the primary bundles of fibres of the brain which *diverge* as they advance to form the immense mass of the hemispheres.

A great portion of these fibres pass to and through the ganglions in their course to the convolutions, from which another set of fibres *converge* through the white substance, and corpus callosum to the same ganglions in the centre of the brain.

## Figure 14,

Is a view of the inside of the right hemisphere of the brain with the convolutions cut away, to show the *converging* fibres from the convolutions to the corpus callosum, which communicate with the great cerebral ganglions by means of a superficial band or layer called the semi-circular tapeworm. A section of the great inferior ganglion is removed, which shows its white color in strong contrast with the dark or redish grey color of a portion of the great superior ganglion inclosed between it and the front part of the corpus callosum.

"The convolutions internally consist of white fibres, which are covered on their extremities with cineriterous substance. The fibres which terminate the nervous bundles of the cerebral crura are not all of the same length. Many, especially of those which are situated on the outer sides of the convolutions, terminate immediately beyond the exterior walls of the cavities; the others extend to distances progressively greater as they run more centrally, those of the interior extending farthest of all. (See figure 11, convolution c.) It is in consequence of this peculiar structure that prolongations and depressions are formed on the surface of the hemispheres. The cineriterous substance follows all the forms composed by the white fibres, and covers every elevation and depression with a layer. These layers meet in the middle line of the convolutions, and are slightly agglutinated by means of a very delicate nurilema."–*Spurzheim.* Fig. 11, *e.*

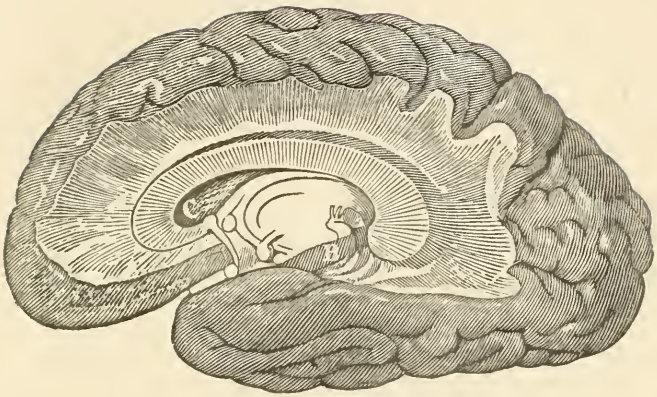
"The corpus callosum extends anteriorly and posteriorly beyond the striated bodies (great superior and inferior ganglions, fig. 14). Its thickness at either extremity is greater than at its middle. The fibres which compose the folds of the corpus callosum proceed evidently from the convolutions which form the most anterior and posterior parts of the hemispheres," which communicate with the great cerebral ganglions by means of a superficial band or layer called the semi-circular tapeworm.

"Nothing can be easier than by dissection, to prove the two orders of cerebral fibres, the diverging and the converging, and to show that the mass or bundle called corpus callosum belongs to the converging order." "Their direction is consequently entirely different from the bundles (of fibres) constituting either of the two great cerebral ganglions."

"The convolutions are for the most part inclined slightly to the roof of the ventricles—they rarely stand up vertically. Their peripheral edge is frequently depressed, and this gives them an appearance similar to that which a fold of paper takes when its edge is pressed lightly inwards." *Ibid.* fig. 12.

The converging fibres, like the diverging ones before described, are double, one set of each, of which is connected with the surface of the

FIG. 14.




A—Front part of the right hemisphere of the brain.

B—Great inferior ganglion.

C—Great superior ganglion.

brain through the cineriterous substance of the convolutions, and the other with the surface of the ventricles. See fig. 9, fig. 11, and fig. 14. The opposite ends of the converging fibres are connected with the great cerebral ganglions, while the opposite ends of the diverging fibres are connected with the flexor and extensor muscles and with the serous and mucous surfaces of the different parts of the body. Drs. Gall and Spurzheim say, "the same nervous fibres do not go to the muscles and skin," and that "the spinal marrow consists of nerves of motion and of feeling." Physiognomical System of Drs. Gall and Spurzheim, 1815, p. 23 to 25. Sir Charles Bell demonstrated the correctness of these opinions in his work, entitled "An Exposition of the Natural System of the Nerves of the Human Body, 1823."

"Drs. Gall and Spurzheim have the merit of having discovered and first taught the true anatomy of the brain. For many years their representations of the structure of this organ were ridiculed, and the accuracy of them denied with the greatest pertinacity; but they are now very generally admitted to be correct. Some errors may, perhaps, be discovered in them; but their general truth is beyond question.

In surveying the relations of the parts, it is useful to begin with the spinal marrow.

In 1810, Drs Gall and Spurzheim represented the spinal marrow as consisting of a tract for motion, and one for sensation;* and in 1818, Dr. Spurzheim published strong reasons for the inference that certain of the nerves proceeding from it perform the functions of motion, while others communicate sensation.† Several years afterwards, Sir Charles Bell described it as consisting of two halves, a right and left, extending its whole length. According to his first view, he described each lateral portion as consisting of three tracts or columns; the anterior-lateral giving origin to the nerves of voluntary motion; the posterior-lateral giving origin to the nerves of sensation; the middle-lateral to the nerves connected with respiration.‡ The capital, or top of the spinal column, is the *medulla oblongata*. Cruveilhier and Bellingeri deny the accuracy of Sir Charles Bell's opinions on this subject. Bellingeri divides the spinal marrow into three double columns, and assigns motion to the front and back, and the instinctive movements to the middle column. He regards the grey matter of the spinal cord as connected with sensation.§ At all events, Sir Charles

* Anatomie et Physiologie, &c., p. 67, 4to. Paris, 1810.

† Observations sur la Folie, par G. Spurzheim, pp. 26, 27. Paris, 1818.

‡ In his paper, read before the Royal Society on the 30th April, 1835, he appears to have renounced this opinion, and now describes the posterior roots of the spinal nerves as attached to the lateral or middle columns, or middle lateral; p. 231, 3d edition of "The Nervous System."

§ *De Medulla Spinali*, pp. 89, 93, 95, 117.

Bell's view, that motion belongs to the anterior, and sensation to the posterior roots of the spinal nerves, is admitted by Tiedemann, Müller, and the highest physiological authorities, and I here assume it to be correct.

At the upper extremity of the spinal marrow, and in continuation of its anterior, or motory, tract, we meet with the *corpora pyramidalia*.

These bodies consist of medullary fibres, which decussate at their lower extremity (c c Fig. 10).

The fibres of the *corpora pyramidalia* proceed upwards through the *pons Varolii* (B Fig. 6).

After escaping above its upper border, the *greatest number* of them pass still upwards, and form the anterior and external bundles of the *crura cerebri*, (*g* Fig. 13) and the exterior part of the *corpora striata*, and ultimately they expand into the inferior, anterior, and exterior convolutions of the *anterior* and *middle lobes* of the brain: Gall, Phys. du Cerveau, vol. i. p. 279.

There is an observable proportion between the size of the *corpora pyramidalia* and that of the convolutions now mentioned.

A portion of the fibres of the *corpora pyramidalia* pass into the great ganglion of the middle and posterior lobes, commonly, but erroneously, named the optic *thalami*, (*o*. Fig. 12) and ultimately constitute part of the *posterior* lobes of the brain: Solly on the Brain, p. 233; Spurzheim's Physiog. System, p. 38.*

Finally, a number of fibres proceed from the lower extremity of the *corpora pyramidalia*, near the point of decussation, accompanied by a number of fibres which originate in the anterior, or motory, tract of the spinal cord, immediately below said point, to the *cerebellum:* Solly on the Brain, p. 155.

The fibres of the *corpora pyramidalia* thus constitute the great mass of the anterior lobes; and enter into the substance of the middle lobes; into that of the posterior lobes; and into that of the *cerebellum*.

The *corpora olivaria*, (C C Fig. 3) and *corpora restiformia* (T T Fig. 3) are placed at the summit of the posterior-lateral columns of the spinal cord, which are devoted to *sensation*.† The *corpora olivaria* pass up-

* The passage of certain fibres from the *corpora pyramidalia* into the *posterior* lobes appears not to be well ascertained, and I am not certain that I correctly interpret these authorities in citing them in support of this opinion. From the influence, however, which the mental organs situated in these lobes exercise over various *instinctive* motions of the body, I anticipate that a direct connection will yet be traced between them and the motory tract already ascertained, or that an *additional* tract for manifesting *instinctive* movements will be discovered, with which they and the organs of the other feelings will be found to be connected.

† "In the composition of the spinal cord," says Mr. Solly, "we can observe no line of demarcation by which the tract of sensation may be distinguished from that of motion, but a portion of the cord anterior to the posterior fissure is distinctly ascertained to be

wards into the *pons Varolii*, and form the posterior and interior parts of the crura; thence they proceed through the great posterior ganglion, *(thalami nervorum opticorum)* and then expand partly into the convolutions of the anterior lobe, lying on its superior surface, towards the mesial line, partly into the superior convolutions towards the mesial line of the middle lobe; but chiefly into the convolutions of the posterior lobes: Gall, Physiologie du Cerveau, tome i. p. 281.

Sir Charles Bell says that the fibres of the middle lateral columns decussate at the same point as that at which the *corpora pyramidalia* decussate.

The fibres of the *corpora restiformia* ascend and form the chief part of the cerebellum; but a portion of them proceeds still upwards, and enters into the composition of the posterior lobes of the brain.

In the centre of the *crus cerebri*, the fibres of the motory tract (D in Figure 6) are separated from the fibres of the sensory tract to the left of the letter c in Figure 6, by a portion of cineritious substance denominated the *locus niger*.

The two hemispheres of the brain are separated by the falciform process of the *dura mater*, which descends between them to the *corpus callosum* or great commissure. The different parts of the brain are brought into communication with each other by means of the following commissures, which Mr. Solly arranges under three heads; the transverse, longitudinal, and oblique.

The transverse commissures, six in number:

1. The great transverse commissure of the hemispheres, or the *corpus callosum*.
2. The pineal commissure.
3. The posterior commissure, or commissure of the posterior cerebral ganglia.
4. The soft commissure, or commissure also of the posterior cerebral ganglia.
5. The anterior commissure, or commissure of the *corpus striatum*, or anterior cerebral ganglia.

appropriated to this function." "I shall assume, therefore, that the line of demarcation is about the middle of the lateral aspect of the cord, and that the sensory column, or tract of sensation, consists of two portions, the one posterior to the fissure referred to, and consequently named the posterior column, the other anterior to it, constituting part of the antero-lateral column."—*Solly on the Human Brain*, p. 225. I recommend to the attention of those readers who regard *the want of lines of demarcation* between the different cerebral organs as a fatal objection to Phrenology, the preceding observation of Mr. Solly, that the same difficulty occurs in distinguishing the tract of sensation from that of motion in the spinal cord. Nevertheless he does not hesitate to state that the essential functions of these different parts of the cords are positively ascertained. His own remark is, that "it is quite possible that perfect distinctness of parts, as regards their function, without any visible line of separation, may exist;" p. 153.

6. The commissure of the cerebellum, or *pons Varolii*.

The longitudinal commissures, two in number:

1. The superior longitudinal commissure.

2. The inferior longitudinal commissure, or fornix. It connects the parts of the same hemisphere.

The oblique commissure is single. It consists of,

1. The inter-cerebral commissure, or *processus e cerebello ad testes*, with the valve of Vieussens.—Solly on the Human Brain, p. 194.

### OF THE CEREBELLUM.

The cerebellum consists of three portions, a central and two lateral.

The cerebellum proceeds, in the first instance, from the *corpora restiformia*. The fibres of these bodies proceed upwards, enter into the *corpus dentatum* (cerebellar ganglion) of the cerebellum, and finally expand into its laminæ or folds.—Gall, *lib. cit.* pp. 250, 251.*

Certain fibres, already described, arising from the summit of the anterior column of the spinal marrow, and from the lower extremity of the corpora pyramidalia or motory tract, proceed upwards and laterally, and enter the cerebellum. Mr. Solly (p. 57) has the merit of having first clearly demonstrated the course of these fibres, although Drs. Gall and Spurzheim have alluded to their existence.

The *pons Varolii* is the great commissure uniting the two lateral portions of the cerebellum.—Gall, *lib. cit.* p. 258.

### OF THE CORPORA QUADRIGEMINA.

Certain fibres originating in the corpora olivaria, are said by Tiedemann† to form the corpora quadrigemina (a c Fig 7). Reil says that some of the fibres of the corpora pyramidalia go to them.

The superior pair of the corpora quadrigemina, or tubercles, are regarded by Dr. Gall as ganglions, which give origin to the optic nerves (*lib. cit.*

* The *corpora restiformia*, says Mr. Solly, or the processus e cerebello ad medullam oblongatam, "are not, as they have been usually described, bodies which are formed solely by the *posterior* columns; nor are they bodies which consist of fibres from the posterior columns, to which some fibres from the anterior columns are added, the additional fibres lying perfectly parallel to those of the posterior columns; but they are bodies which consist of fibres that interlace in rather an intricate manner, the interlacing fibres consisting of some from the antero-lateral, and some from the posterior columns;" p. 158.

† On the Anatomy of Fœtal Brain, pp. 182, 183; *Bennett's translation.*

p. 121.) The functions of the inferior pair are not ascertained. They are placed on the upper part of the medulla oblongata (c Fig. 6.)

A broad band of medullary substance, "thick laterally, but extremely thin in the centre," passes from the cerebellum upwards and forwards to the tubercles, commonly called the processus e cerebello ad testes, and the valvula of Vieussens (n Fig. 7).—Solly, *lib. cit.* p. 178.

## RELATION BETWEEN THE STRUCTURE AND THE FUNCTIONS OF THE BRAIN.

The convolutions of the brain appear to stand in a relation to the spinal marrow analogous to that which the superficial expansions of the nerves of the external senses, of motion, and sensation, on their respective organs, bear to it.

The convolutions of the *anterior* lobes of the brain* manifest the intellectual faculties.†

The Intellectual Faculties enable man to perceive objects that exist, their qualities and relations; and when acting together, they constitute WILL.

The convolutions which manifest these faculties spring from the *corpora pyramidalia*, which are now generally considered to be the top of the motory tract of the spinal marrow. Here, then, is a direct relation between the convolutions which *manifest* WILL, and the motory tract which *executes* WILL; an arrangement that appears to accord with the best established principles of Physiology.

The convolutions of the *middle* and those of the *posterior* lobes of the brain, manifest the Propensities and Sentiments, or Feelings.

These convolutions spring chiefly from the *corpora olivaria*, but partly also from the *corpora restiformia*. These bodies constitute the top of the *sensory tract* of the spinal cord.

The cerebellum springs from the *corpora restiformia*, which, as has just been mentioned, is viewed as a portion of the top of the sensory tract of the spinal marrow.

The function of the cerebellum is to manifest the instinct of reproduction, which also is one of the *feelings* of the mind.

But, in the next place, certain fibres proceeding from the corpora pyramidalia, or motory tract, enter into—

The middle lobes,

* Precisely speaking, it is only the anterior, inferior, and lateral convolutions of the anterior lobe which manifest intellect. The superior convolutions of this lobe manifest sentiments or feelings.

† The evidence of the functions of the convolutions is stated in the different works on Phrenology.

The posterior lobes, and
The cerebellum.

While, therefore, the convolutions of the anterior lobes* are formed of fibres connected with the motory tract, the convolutions composing the posterior and middle lobes, and the cerebellum, are composed of fibres connected with *both* the motory and sensory tracts.

The middle and posterior lobes, and the cerebellum, manifest a variety of different feelings, each particular feeling being connected with a particular part of these masses, as is explained in the works on Phrenology.

Each of these feelings acts upon, and manifests itself by means of the muscular system. Thus fear, rage, affection, or any other feeling, communicates great energy of action to the muscles of voluntary motion.

Each of the feelings instinctively impresses motions on the muscular system pecular to itself, and expressive of its distinctive character, which motions are named by phrenologists its natural language. Thus, the organ of Self-Esteem, when predominantly large, produces an instinctive tendency to carry the head and body reclining backwards. The organ of Firmness, when predominantly large, produces the tendency to support the body in a stiffly erect position, as if the spinal cord were supported by a rod of iron running along its whole length. The cerebellum also impresses peculiar motions on the muscular system expressive of its character. These motions, as I have said, are instinctive; that is to say, they are the instantaneous and direct results of the activity of the several feelings, and not the consequences of intellectual perception and will.

The arrangement of structure by which each of these organs of feeling is supplied with fibres in direct connection with the motory tract, is in harmony with this influence of the emotions over the motions of the body. But we should expect a *separate* tract for *instinctive* motion, which is clearly distinguishable from voluntary motion, and also that the organs of the *feelings* should be connected directly with it. There is still much obscurity in the views of physiologists concerning the connection of the middle and posterior lobes with the motory tract.

Again, it is certain that the mental *emotions* exercise a powerful influence over the organic functions; when agreeable, they stimulate them to healthy action, and when painful, they depress their energies, and produce liability to disease. Reciprocally, when the organic functions, such as digestion, respiration, and secretion are disordered, an irritable and distressing state of the mental feelings is induced.

The intimate relations between the convolutions of the brain devoted

* Excepting always those on the upper surface which manifest feelings, and which derive their origin from the sensory tract as before described.

to the mental emotions and the sensory tract of the spinal cord, is in harmony with these facts.

The habit of contending with *intellectual* difficulties, if unconnected with feeling, does not injure the organic functions so severely as do strong and painful emotions; but it weakens the locomotive powers. Sedulous students of abstruse problems, acquire a great aversion to locomotion.

These facts correspond with the arrangements of structure by which the convolutions of the anterior lobes devoted to intellect, spring from the motory tract, and are less intimately connected with the sensory tract of the spinal marrow.

The convolutions of the anterior lobes bear an analogy to the peripheral expansion of a simple nerve of motion; while the convolutions of the middle and posterior lobes, and the cerebellum, bear an analogy to the peripheral expansion of the *combined* nerves of sensation and motion.

The functions of the convolutions of the brain, and of the laminæ of the cerebellum, being to manifest respectively thought and mental feeling, they do not produce what, for distinction's sake, may be called *bodily pain.*

These convolutions and the cerebellum, although situated, when man is in the erect position, *above* the spinal cord, neverthless stand in the same relation to it, as do the peripheral expansions of the cerebral nerves; that is to say, they are composed of the *distal* ends of the fibres, which can be traced inwards to the spinal cord.

If an experimenter were to separate the *motory* branch of the fifth nerve, (arising in the *crus cerebri*,* the motory tract,) and expanding on the head and face,—from the *sensory* branch of the same nerve (arising from the posterior columns of the spinal cord, about an inch and a half below the pons Varolii, the sensory tract,) along its whole course; and if he were to destroy the former, or motory branch, at its periphery, the animal would experience no *pain*, because this is a nerve of motion; and no convulsions would ensue until the lesions reached close upon the motory tract itself;† because the influence of irritation on nerves of motion is propagated only *outwards from* the spinal cord; and in the case here supposed, the mutilations and irritations would proceed *inwards* from the *distal* extremity of the nerve *towards* the spinal marrow. The whole portions of the nerve lying *outwards* from the point of irritation, as this

* Mr. Solly describes this branch as arising from the "inter-cerebellar commissure, very close to the cerebellum,"—*Lib. cit.* p. 249; but he adds, that its origin from these fibres proves they "must be a portion of the motor tract."—P. 251.

† I here suppose the *whole* filaments to be *destroyed*, commencing from the periphery. If the nerve were merely *irritated* at any part of its course, the muscles, which derive their filaments from the part of the nerve *below* the point irritated, would be thrown into contraction, while those deriving their filaments from points above the part irritated would remain quiescent.

point by successive mutilations approached the spinal marrow, would be necessarily destroyed, and therefore could produce no movements.

When Magendie, Flourens, and other physiologists, cut away the convolutions of the anterior lobes, they performed an experiment analogous to this which I have now described. They commenced at the distal extremity of the fibres of the convolutions which are connected with the motory tract, and they destroyed them in proportion as they carried their ablations towards the spinal cord. Whatever the functions of these convolutions might be, the power of manifesting them must obviously have ceased by their destruction; and as it was known that the convolutions of the brain do not manifest ordinary sensation, they were not authorized, by the analogy of the nerves, to expect either pain or convultions to be excited until they arrived at the motory tract itself; which accordingly was actually the case. When Magendie cut the corpora striata and tubercles, the animals "rolled," "went forward, "extended," and "bent their heads and extremities."

Again, if the nerves of motion and sensation ramified on the hand were destroyed in combination, commencing from the surface of the skin at the extremity of the fingers, and proceeding upwards to the spinal cord, pain would be felt, because a nerve of sensation had been destroyed, and such nerves propagate their impressions *inward* from their peripheral expansions *towards* the spinal cord and brain; but, for the reason before stated, there would be no convulsions, until the motory tract of the spinal cord itself was reached and irritated.

The experiments of Magendie and Flourens, in cutting away the convolutions of the middle and posterior lobes of the brain, were analogous to this supposed proceeding. They removed parts which manifest mental emotions, but do not produce pain; and the organs being destroyed, no emotions and no pain were manifested. These organs are connected by some fibres with the motory tract, but these fibres were cut away from their distal extremities, and no effect on motion was produced until the motory tract itself was assailed; all which facts accord with the views of the structure and functions of the brain and spinal marrow now presented.

These experimenters held Dr. Gall's discovery of the functions of the *convolutions* of the brain in too much contempt to allow themselves to see these plain connections and results. Indeed they did not proceed as if it were possible that his ideas *could* be true. Still their experiments, however little calculated to throw light on the functions of the convolutions, produced phenomena which harmonized with the functions ascribed to these parts by Dr. Gall. Cuvier reports, that when Flourens destroyed the hemispheres, the animals so mutilated became "quite drowsy;" they "had no *will* of their own," and "made no *spontaneous* motion." Further, "he pricked the hemispheres without producing either contraction

of the muscles or any apparent pain to the animal." In short, Flourens found that, by cutting downwards from the surface of the convolutions of the brain, he did not cause either muscular contraction, or excite pain, until he arrived "at the top of the *medulla oblongata*, at the spot where the quadrigeminal bodies are attached to it," but that, by irritating the motory and sensory tracts at this point, he produced both pain and convulsions. Magendie produced motion by irritating the corpora striata.

These facts appear to show that the proper or peculiar functions of the sensory and motory tracts commence at these parts; and they accord with Dr. Gall's views of the structure and functions of the convolutions.

In irritating the brain from below *upwards*, Flourens found that, after he had passed the point at which the tubercles are attached, his operations produced neither pain nor convulsions.

This fact also accords with the views of the structure and functions now presented. If the convolutions had been organs of motion or of ordinary sensation, convulsions and pain should have followed by irritating their fibres at the *end next the spinal* marrow; but their functions are to manifest intellectual perception and mental emotions, and Flourens does not report that *these* powers were not disturbed by his irritations. There are no muscles which receive nerves of motion, nor mucous surfaces which receive nerves of sensation, *above* the corpora striata and corpora quadrigemina in the brain. These fibres, therefore, which ultimately constitute the convolutions, although proceeding from the motory and sensory tracts, may reasonably be presumed to perform functions distinct from motion and sensation. Our view is, that they are the organs of mental faculties which *use* muscular motion and sensation as their instruments of manifestation; and the relations of the convolutions to the two tracts in question accord with this idea.

Finally, it will be observed that the fibres of the cerebellum spring from the sensory tract, and *also from the motory tract*, and that it is situated *close* to the commencement of these tracts, assuming the commencement to be at the tubercles, as asserted by Flourens.

The results observed by Flourens in his experiments on the cerebellum, as reported by Cuvier, were these: "During the ablation of the first slices of the cerebellum, only a little weakness and a want of harmony in the movements occur. At the removal of the *middle slices*, an almost *general agitation* is the result. The animal, continuing to hear and to see, executes only abrupt and disorderly movements. Its faculties of flying, walking, standing up, &c., are lost by degrees. When the cerebellum is *removed*, the faculty of performing regulated movements has entirely disappeared."

Although muscular motion is excited, according to Magendie, by irritating the *corpora striata*, and, according to Flourens, by irritating the

tubercles, the precise points at which this influence of irritation commences is not well ascertained. In cutting away the hemispheres of the brain, the entire convolutions appear to have been removed without muscular action having been induced; whereas it is said that movements were manifested on removing the first slices of the cerebellum. These facts, if they were not liable to great complication and uncertainty from the deep injuries in which they involved the nervous system in general, would appear to shew that the surface of the laminæ of the cerebellum is more directly related to the motory tract than is the surface of the convolutions of the brain. The motions, however, described by Flourens as accompanying the mutilations, may have been caused by intense pain, arising from irritation communicated through the cerebellum to the *sensory* tract, or by irritation communicated through the same medium to the *motory* tract, in consequence of the very close approximation of the cerebellum to these tracts. Whether the difference of the effects produced by injuring the convolutions, and by injuring the laminæ of the cerebellum, may have arisen from the closer approximation of the cerebellum than of the convolutions, to both the motory and sensory tracts, it is difficult to determine; but not one of these results excludes the fact that the cerebellum manifests the instinct of reproduction.

Farther, there is no specification of the *depth* to which either the *first* slices, or the *second* slices, in these experiments extended, while the last slices extirpated the cerebellum entirely, or cut down directly on the sensory and motory tracts. If we consider the connection and close approximation of the cerebellum to the motory and sensory tracts, we shall have no difficulty in discovering how very applicable the following words of Cuvier are to the phenomena which ensued upon these operations: "After all," says he, "it must be observed, that in too deeply extirpating the *tubercles*, we interfere with the *medulla oblongata* and then violent convulsions, which last long, make their appearance." He might have said, with equal reason, that when we too deeply extirpate the cerebellum, we interfere with the *medulla oblongata;* and we need not be surprised that an animal which has suffered this mutilation should appear as "in a state of apparent drunkenness," unable to regulate its movements.

Dr. Vimont considers that the *processus vermicularis*, or middle portion, of the cerebellum, does not perform the same functions with the two lateral masses; and he states that he had found it "always large in the climbing animals, such as the cat, the squirrel, and the martin; and in those whose footsteps are very sure, or which are able to walk easily on sloping ground, or on steep places." Mr. Solly, on the other hand, observes on this point as follows: "Reil held, with Gall and Spurzheim, and I have no doubt he was correct in his opinion, that the 'cerebellum is

not composed of elementary portions essentially different, but is one homogeneous mass.' As I understand the cerebellum, it is one instrument for the production of power, and not many instruments united together. It consists, like the cerebrum, of two hemispheres united anteriorly by a commissure called the pons Varolii; and by Reil, it is described as being united posteriorly by another commissure, which, projecting on its upper and under surface, forms what have been called, from their appearance, the *processus vermiformis superior and inferior.* I confess this portion of the cerebellum does not appear to me to be an apparatus of union, but rather a centre of power placed in the mesial line, and connected laterally with the two hemispheres, perfectly analogous to the cerebellum of the bird and hare; Reil himself stating that, in the brain of the hare, there is little more than a vermiform process. Indeed, a mere section of it ought to be sufficient to convince us that it is no true comissure."—*Lib. cit.* p. 196. I leave the reader to form his own judgment whether the whole cerebellum performs a single function; or if, as Dr. Vimont thinks, the middle portion is connected with motion, and the two lateral portions with the instinct of reproduction.

Professor Broussais says, "I ascribe the direction of the (voluntary) movements, the acts, the aptitudes, which have a reference to generation, to the influence of the cerebellum. But I maintain that these cannot be accomplished without the permission, nay, without the assistance, of the brain; and that it is in this sense alone that the cerebellum can be considered as the regulator of muscular action."

These remarks agree with the views of the structure before presented. The cerebellum is composed of fibres connected with the motory tract, and of fibres connected with the sensory tract. It is an organ of feeling, but it also influences voluntary motion by instinctive impulses, as the other feelings do. It is obvious that it may accomplish this effect by means of the fibres before described, which connect it directly with the motory tract of the spinal cord.

Dr. Broussais continues—"The brain always remains master of the movements of the cerebellum tending towards the act of generation, so as to be able to assist them; and it effectually exerts this power, in a variety of circumstances, as every one knows." The view of the structure before presented, which regards the anterior lobe as the organ of will, and as composed of fibres, connected directly with the motory tract, accords with these remarks of Broussais. The *will*, by means of the powerful and direct influence which the anterior lobe exerts over the motory tract, "remains master" of all the voluntary movements.

It is now generally admitted by physiologists, that the optic nerves terminate in the *corpora quadrigemina*, which are, in fact, their proper ganglia. The functions of the retina and optic nerve are to receive and trans-

mit the impressions of light to the brain. It, therefore, is an organ of sensation. These impressions, however, instinctively produce a great variety of muscular movements, especially in the eye itself and its integuments.

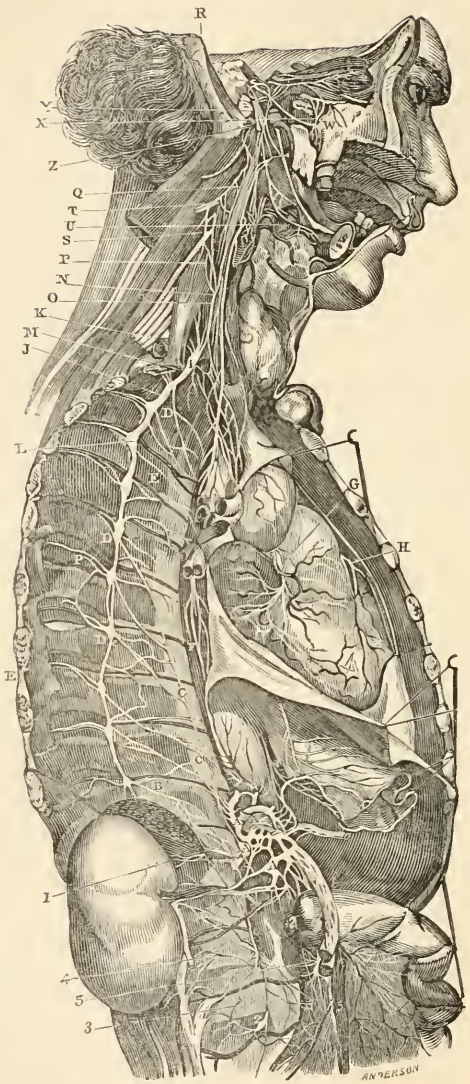
The *corpora quadrigemina*, which are its ganglia, are derived from the *corpora restiformia*, or sensory tract.* But Reil says, that these *corpora* also derive fibres from the *corpora pyramidalia*, or *motory* tract. This structure corresponds with the idea that the optic nerves are organs of sensation, but that they also influence motion.

Farther, the eyes are *moved* by the third pair of nerves, or COMMON OCULO-MUSCULAR, and by the fourth pair, or INNER OCULO-MUSCULAR. Mr. Solly describes the third pair as connected by one portion "with the motor tract in its passage through the pons Varolii. The other portion is partly lost in the locus niger, and party mingled with those fibres which the inter-cerebral commissure, or processus e cerebello, sends through at this point." (p. 246.) The *fourth* pair "arise from the inter-cerebral commissure, close to the optic tubercles; the nerves proceed, in fact, from those fibres which descend to the centre of the crus cerebri, so that we at once observe an immediate connection between the fourth pair and the third, and, as we shall presently see, with the motor root of the fifth also." p. 247.

This structure, which derives the nerves that move the eyes from the motory tract, is calculated to render them subject to the will, while their origin also from "the inter-cerebral commissure, close to the *optic tubercles*," is in harmony with their subserviency to the instinctive impulses of the organ of vision. Many motions of the eyes are instinctive, and many voluntary. The circumstance of the eyes being provided with two nerves of motion, and one of them, the third pair, having a double root, strengthens the conjecture that there may be two motory tracts, one for voluntary and another for instinctive motion. Some of Mr. Grainger's observations seem to favor this idea.

* There is still some obscurity in the works of different anatomists on this point; which arises probably from a want of precision in their views of the exact limits of the olivary and restiform bodies.

FIG. 15.



# CHAPTER III.

## GANGLIONIC SYSTEM OF VEGETATIVE LIFE.

### Figure 15,

Is a view of the ganglions of the organs of the body, and other structures, connected with the great sympathetic nerve, reduced from Manec's grand plate, by John Harrison Curtis, Esq., London.

AAAA, Semilunar ganglion and solar plexus. The ganglion is placed upon the base of the two pillars of the diaphragm, one being on each side, and the right generally larger than the left.

B, Small splanchnic nerve. Consists in the union of two or three twigs, furnished by the last thoracic ganglia.

C, Great splanchnic nerve. Formed by the junction of three, four, five, or eight twigs, coming from as many thoracic ganglia.

DDD, Thoracic ganglia. Ten or eleven in number, corresponding with the posterior part of the lateral side of the body of the dorsal vertebræ; most of them rest on the head of the ribs; others correspond with the level of the intercostal space.

E, Internal branches. All of them are attached upon the body of the vertebræ, and advance, ramifying and communicating with each other, towards the median line, where they are distributed over the œsophagus and the aorta.

F, External branches. Two for each ganglion, very different from each other; one large, red, pulpous, and going to the intercostal nerve; the other much smaller, white, giving off no twigs, and passing from the intercostal to the ganglion.

G, Right coronary plexus. Passes between the pulmonary artery and the aorta, and accompanies the anterior coronary artery.

H, Left coronary plexus. Passes before the left branch of the pulmonary artery, goes to the posterior side of the heart, and accompanies the left coronary artery.

I, Inferior cervical ganglion. Placed behind the vertebral artery.

J, Inferior twigs. Commonly a single branch communicating with the first thoracic ganglion.

K, External threads. Very slender, and communicating with the last cervical and the last two dorsal pairs; some filaments pass round the subclavian artery.

L, Internal twigs. Very minute, and distributed to the longus colli, upon the anterior part of the spine: some of them descend to the pulmonary plexus.

M, Anterior threads. Two or three in number, constituting the inferior cardiac nerves.

N, Middle cervical ganglion. Placed on a level with the body of the fifth or sixth cervical vertebra, and covered by the internal jugular vein.

O, Interior twigs. Three or four in number, all passing over the inferior cervical ganglion.

P, External twigs. Vary much in number, and give off ramifications communicating with the cervical pairs and the phrenic nerve.

Q, Superior cervical ganglion. Situated on the anterior and lateral part of the second, third, and fourth cervical vertebræ.

R, Superior branches. Two in number, and placed behind the internal carotid artery.

S, Inferior branch. Rarely double, and descends upon the great rectus muscle as far as the middle cervical ganglion.

T, External branches. Their number very variable; they communicate with the first, second, and third cervical pair.

U, Submaxillary ganglion. Situated upon the internal side of the submaxillary gland, a little below the stylo-glossal muscle.

V, Vidian nerve. A branch springing from the posterior side of the spheno-palatine ganglion.

W, Naso-palatine branch. One of the internal branches of the spheno-palatine ganglion, entering the nasal fossæ by the spheno-palatine foramen.

X, Spheno-palatine ganglion. Placed in the summit of the zygomatic fossa.

Y, Ophthalmic ganglion. Situated in the orbit, and occupies the external side of the optic nerve.

Z, Auditory nerve and membrane of the tympanum, containing, within its cavity, four small bones, viz: the stapes, the incus, the malleus, and the os orbiculare

1, Renal plexuses. Furnished by threads coming from the solar and cœliac plexuses, and from the last dorsal ganglion, the first lumbar, and the small splanchnic nerve.

2 2, Lumbar ganglia. Commonly four or five; the first corresponds with the body of the first lumbar vertebra, the last with the fifth.

3, Internal branches. Numerous; go downwards and inwards to the aorta, where they are lost in the aortic plexus.

4, External branches. Two of these, at least, arise from each ganglion; they follow a course more or less flexuous towards the anterior branches of the lumbar nerves.

5, Aortic flexus. Formed by threads from the solar plexus, superior mesenteric, renal, small splanchnic nerve, and internal branches of the lumbar ganglia.

The "ganglions," connected with the great sympathetic nerve, are bodies composed of two nervous substances; the white or fibrous, and the gelatinous or pulpy, into which the first is plunged. The pulpy matter of the ganglions is commonly of a grey color, of different degrees of intensity; sometimes, however, it has a yellowish, a redish, or a whitish cast. It is easily distinguishable from the nervous filaments which it surrounds. The fibres of the white substance, the second element of the ganglions, anastomose repeatedly; they also cross each other frequently; sometimes in every direction, or, in their course, parallel with that of the nerve upon which the ganglion is formed. Ganglions of this last kind are commonly oval shaped, but those in which several nerves meet and inosculate, have, for the most part, very irregular forms.

"The nerves frequently emanate from distant and opposite sources to unite, anastomose, or twine together, and then to separate and run off in different directions. This is the particular arrangement to which the term plexus is applied."—*Spurzheim.*

In regard to the character and functions of the great sympathetic nerve, its ganglions, and the nerves that issue from them, Bichat says,—"The ideas of anatomists upon this important nerve, seem to me very little accordant with what nature proclaims to be just. All agree in representing it as a medullary cord, extending from the head to the os sacrum, sending various branches, in its course, to the neck, the chest, and the abdomen; having, in short, a distribution analogous to the spinal nerve, from which, or from those of the neck, it is said by some to derive its origin. Whatever the name chosen to designate it may chance to be, sympathetic, intercostal, or trisplanchnic, the mode of considering it will still be found to remain unchanged.

"This mode I regard as altogether erroneous. In fact, there exists no such nerve, as these names are used to signify. That which is taken for a nerve is, in truth, but a suit of communications between different

nervous centres, situated at various distances from each other. These centres are the ganglions, scattered through the different regions of the body. They have all an independent and isolated action. Each is a particular focus, sending a multitude of ramifications, to carry into the respective organs the irradiations of the centre whence they proceed."

"What anatomist," he continues, "has not been struck by differences among the nerves? Those of the brain are larger, whiter, more dense, less numerous, and offering few varieties; whilst extreme tenuity, great number, especially around the plexuses, greyish color, peculiar softness of tissue, frequently accruing varieties, are, on the other hand, the distinguishing characters of the nerves that issue from the ganglions. The only exception in either are in the branches of communication between the cerebral nerves and in a few of the twigs that unite the little nervous centres."

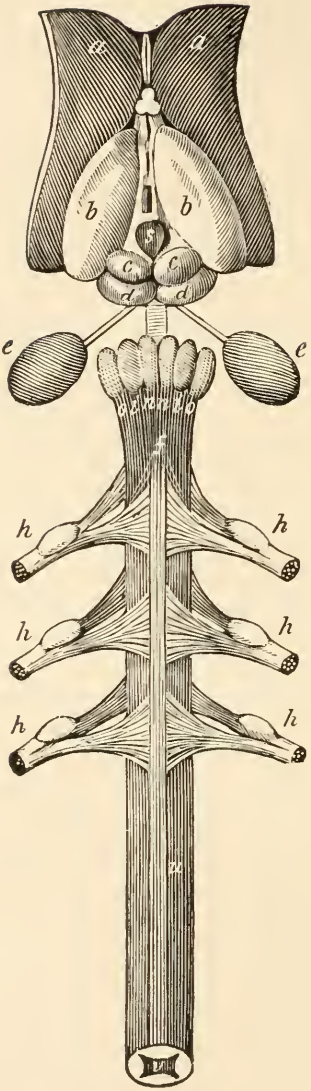
"A glance," says Bichat, "enables us to discover the greatest difference among them (the ganglions.) There is evidently as great a distinction between the ganglions and the nerves that issue from them, as there is between the cerebral nerves and the brain itself. There is difference of consistency and other outward qualities, and there is difference of properties."

On these and other observations of Bichat on the same subject, Spurzheim remarks, that "notwithstanding all this, the opinion in regard to the use of the ganglions, which Johnstone, Bichat, and Reil entertained, and which others have adopted from them, is by no means exact. They do not interrupt the reciprocal influence of the brain and nerves of the spinal cord, nor of the brain and viscera of the chest and belly, either in the healthy or pathological state of the body. They most certainly do not prevent impressions made on parts supplied with nerves from them, or diseased sensations of the viscera from being felt. On the contrary, the ganglions would appear essential to the structure of the nerves of sensation. They, however, abstract the parts they furnish with nervous energy, from the influence of the will. They also originate nervous fibres, and serve, farther, as points of communication between different nerves. Lastly, as the existence of a nervous fluid is not impossible, nay, as in all likelihood such a fluid does exist, the ganglions may probably aid in its secretion or evolution, and modify its circulation or distribution."

Willis and many of the old anatomists have ascribed to the ganglions the secretion of what they call the vital spirits.

On a comparison of all the facts which have come to my knowledge in regard to the structure, situation, connection, and use of the ganglions, connected with the great sympathetic nerve, I have no doubt they do "evolve" a nervous fluid, and have none but the fluid they evolve is magnetic.

FIG. 16.



They are undoubtedly nervous centres, and consecutive magnetic poles, and each a particular focus, sending a multitude of ramifications to conduct into the respective organs the irradiations of the centre from which the nerves proceed, to maintain by the action of the magnetic forces continued motion of the organs of the body and other structures with which they are connected. They are elementary organs of vegetative life, having the semilunar ganglions and strong magnetic poles resting on the pillars of the diaphragm for a common centre, and a connection with the brain and cerebellum by the great sympathetic nerve at n, Fig. 7, which completes the circuit of their connection with the brain, cerebellum, organs of the body, and other structures.

Bichat divided correctly the ganglions, nerves, and plexuses into numerous apparatuses, individually necessary to the offices of the different organs; and Spurzheim, from his knowledge of the subject, believed that division to be founded in nature. The nervous masses of vegetative life he also believed were independent of those of phrenic life, in as far as their existence was concerned, and also recognised their communications between themselves, and with the masses of the phrenic functions.

## GANGLIONIC SYSTEM OF PHRENIC LIFE.

### Figure 16,

Is intended to show at one view the situation and comparative size of the ganglions of the brain, cerebellum, medulla oblongata, and spinal nerves.

*a a*, Great superior ganglions—color, redish grey.
*b b*, Great inferior ganglions—color, bluish white.
*e e*, Cerebellar ganglions—color, bluish white.
*i i*, Olivary ganglions—color, bluish white.
*h h h*, Ganglions of spinal nerves.
*n n*, Pyramidal bodies—color, bluish white.
*o o*, Restiform bodies—color, bluish white.
*d d*, Posterior quadrigeminal bodies—color, bluish white.
*c c*, Anterior quadrigeminal bodies—color, bluish white.
*s*, Pineal gland—color, redish grey.
*f*, Medulla oblongata—color, bluish white.
*u*, Spineal cord—color, bluish white.
*v*, Middle cineriterous portion of spinal cord—color, redish grey.

The ganglions of the brain, cerebellum, and spinal nerves, or those belonging to phrenic life, are more or less round or oval, and are composed of the white fibrous and cineriterous substance, the latter surrounding the former like the ganglions of vegetative life, except the great superior ganglion, in which the redish grey, cineriterous, and the white fibrous substance are disposed in alternate layers.

The former arrangement of the two different substances, or different kinds of matter in the other ganglions, corresponds with the arrangement of the same kinds of matter in the brain and cerebellum, which is reversed in the crura, medulla oblongata, and spinal cord. (Fig. 6 and 15.)

Physiologists have given us no light on the subject of the cause of such disposition of these substances. We, however, know that different kinds of matter maintain different forces, and that one of thece forces repels and at the same time expands, while the other attracts and contracts. We also know the repulsive force diverges, or is a diverging force, (Fig. 13,) and the attractive force converges, and is, therefore, a converging force, (Fig. 14,) and corresponds with the arrangement of the fibres of the brain; and as they are good conductors of the magnetic forces, it cannot require, with a knowledge of all these facts, a very great effort of the imagination to see that the diverging fibres may radiate from, and the converging fibres point to, a pole in the centre of the brain.

Assuming, then, that the different kinds of matter of which the brain is composed is imbued with these forces, then the order in which they are disposed, necessarily establishes converging lines of the magnetic forces, from the redish grey cineriterous matter in the surface of the brain to the great inferior ganglions, while diverging lines of the forces are established between the redish grey matter of the great superior ganglions, and the same kind of matter in the convolutions; for the white fibrous matter in the centre of the brain, and the redish grey matter in its circumference, would attract each other, when one of their forces would converge; while the redish grey matter of the great superior ganglions, and of the surface of the brain, would repel each other, when their opposite forces would diverge, and thus correspond with the converging and diverging fibres.

The action of the diverging and converging forces may be demonstrated in various ways; one of the most simple of which is their action on iron filings, when attached to poles of the same and of opposite denominations. When attached to poles of the same denominations they repel and expand, as seen in fig. 17, but when attached to poles of opposite denominations, they attract and contract, as seen in fig. 18, with a power proportioned to the quantity of the forces in the spaces they occupy.

There can be no dispute about these facts, either in regard to the order in which the different kinds of matter are disposed in the brain, the direc-

FIG. 17.

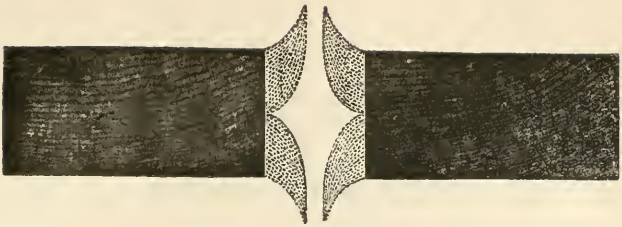


FIG. 18.

FIG. 19.

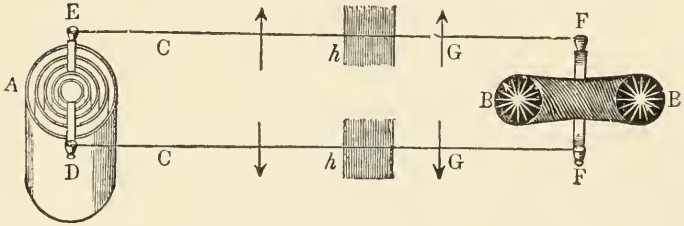
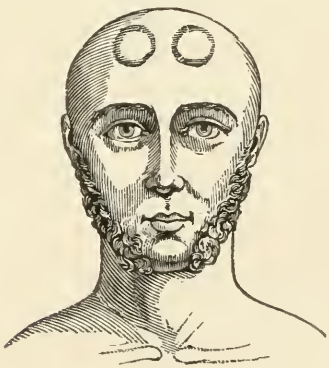



FIG .20.



tion of its fibres, or the action of these forces, which demonstrate their accordance, with the necessary arrangements, to form a pole in a central part of the brain; for they are subjects of the plainest occular demonstration, and it only remains to show a connection of the brain with these forces, in different and extensive surfaces, to demonstrate the necessary existence of one or more poles in this organ.

In studying this subject, it will be necessary to examine the different structures of the body, as a mechanist does a mechine, before we can understand either the kind of power by which motion is produced in the human system or the sources from which it is derived.

## EXCRETING SYSTEM.

On viewing the human frame, we find it covered with a membranous complex structure called the skin. Besides three membranes which are classed under the general term skin or integuments, there are found in it innumerable minute globular bodies called papillary glands. These little globate bodies are found to be highly organized, having minute arteries terminating, and minute veins commencing, in their structure. They are found also, by means of magnifying glasses of great power, to have minute ducts issuing from them, and terminating every where with open orifices on the surface of the skin.

On an examination of the organs, as the brain and spinal cord, eyes, heart, lungs, liver, spleen, pancreas, kidneys, cystis, uterus, stomach, and intestines, we find them all, without a solitary exception, covered with a kind of skin called a serous membrane, in which is inclosed an incalculable number of minute glands or elementary organs, with ducts terminating in open orifices on the surfaces of these membranes, like those of the common covering of the body. The glands of both structures are found, on an examination of the orifices of these ducts, to *excrete* an aqueous or watery fluid, by which these surfaces are constantly maintained in a humid or moist state. The great quantity of this fluid seen running off from the skin, and its accumulation in the cavities containing the organs, when these glands are excited to inordinate action, attest both the perfection of their mechanism and their fitness for their specific use.

If we now proceed to examine the membrane which lines the internal parts of the body, we shall find it, with slight modifications, characterized by the same structure as the serous membranes. This modification principally consists in its having what is called a villous, instead of a serous surface, like the serous membranes. We find the whole tract of the alimentary canal, including the mouth, æsophagus, stomach, and intestines, lined with this membrane, as well as the internal parts of every organ.

On a minute examination of the structure of the mucous membranes, we find them, like the skin and serous membranes, enclosing numerous little round or oval glands or villi, as they are termed, having, like the papillary glands of the skin, their appropriate arteries, veins, and ducts terminating with open orifices on the surface. They are farther characterized by numerous little cavities, crypts or follicles, as they are called, which have more or less a spheroidal shape, and which also open upon the surfaces of these membranes. These ducts and follicles are found to be filled with a semi-fluid or mucus, which is constantly issuing from them, and which spreads upon these membranous surfaces.

In pursuing this subject, we have thus found two different kinds of surfaces disposed in two different ways, and thus covered with two different kinds of fluids; and it is easy to see that there must have been some object in this order and disposition of these different kinds of matter.

On investigating the nature or qualities of these fluids, it is found that the excretions from the skin and serous membranes are more or less acid, and those from the mucous membranes more or less alkaline. They are sometimes so strongly acid and alkaline as to excite the curiosity of the most common observer. The acid is found to be the muriatic and the alkali, soda and muriate of soda or common salt. The acids and alkalies which possess directly opposite properties, and have at the same time the strongest affinities for each other, are universally diffused in the earth as well as in the vegetable and animal kingdoms. They constitute two great and principal divisions of matter, one of which, the acid, for the sake of distinction, is called negative matter, and the other, the alkali, positive. Now it is satisfactorily ascertained, from repeated experiments, that each of these different kinds of matter gives out constantly an innate and different kind of force. It is also ascertained in the same manner that the alkaline or positive matter gives out the negative force, and that the acidified gives out the positive. The positive matter then, on the internal surfaces of the body and organs, is constantly giving out the negative force, and the negative matter on the external surfaces of the body and organs, the positive force. Besides the immense quantities of these forces accumulated on the different surfaces by the process of excretion, large quantities are constantly evolved in the decomposition of food, in the process of digestion; and in the decomposition of the air, in the process of breathing. On a further examination of the human structure, we find four hundred and thirty-six muscles of different forms disposed in different ways for the purpose of producing motion. We know that they are formed for this purpose, for we can see that some of them expand, and others contract, when we move the body or limbs. For when we bend an arm, we find that the muscles on the outside of it expand, while those on the inside contract. On extending the arm, we find this order

reversed; for then the muscles on the inside expand, while those on the outside contract with equal force. One end of each of these muscles is attached to the lower part of the bone belonging to the upper part of the arm, called the humerus, and the other ends are attached to the lower end of the bones of the lower part of the arm, near the wrist, called the ulna and radius ; so that while the lower part of these bones is pushed on one side, when the muscles of that side are expanded, it is pulled at the same time on the opposite side, when the muscles on that side are contracted ; and thus motion is produced by the simultaneous action of these muscles.

Now it is a remarkable fact, that every one of these four hundred and thirty-six muscles which thus produce motion in different parts of the body, is covered with a membrane, the outer surface of which has a serous, and the inner side a mucous surface ; hence these membranes are called muco-serous membranes. All these different surfaces, then, like those of the skin and membranes of other parts of the body, are covered with different kinds of matter, presenting together immense surfaces, from which constantly issue two forces of different kinds.

The reader who has seen a common galvanic battery, cannot fail to observe that this arrangement of surfaces corresponds with that of the different metallic surfaces of the battery. He will also notice that these forces thus maintained on these membranous surfaces, exactly correspond with those necessarily maintained on different surfaces of the battery. The two forces are conducted from the two metallic surfaces to the poles of the battery by two metallic wires, and if we can now find conductors to convey the forces from the skin and different membranous surfaces to poles, the resemblance will be complete and satisfactory.

In pursuing this subject we first find numerous minute threads, called nerves, penetrating the little glands of the skin, serous and mucous membranes, and every fibre of a muscle. On tracing these nerves, we see them uniting together and increasing in size in proportion to the distance from these surfaces, and at length conjoining with the brain and spinal cord. The spinal cord is formed into four columns, united first with a broad base, and then with the brain

These forces are, therefore, conducted from the skin and membranous surfaces and concentrated in the brain to form poles, or a motive power to put in motion this apparently complicated yet really simple machinery.

This structure, arrangement, and order of the different parts of the human body, were well known to Malpighi, Ruych, Haller, Hunter, and Bichat, and are recognized by every anatomist of the present age, and now present to our view a galvanic battery altogether superior to any ever made by man.

The forces elicited from different kind of matter, and known by the names of electricity, magnetism, and galvanism, are now believed, by sci-

entific men, to be the same, their effects only being varied by common causes ; and there can now be no doubt that they are innate in every kind of matter, either in an organized or unorganized state, in quantities proportioned to the density of the matter or other ability to retain them ; the quantity obtained from even one drop of water having been found sufficient to put a small battery in motion.

The common galvanic battery was first constructed by Galvani, and hence called the galvanic battery, fig. 19.

It is in two parts. A is the battery, and B B the poles connected with the battery A by two copper wires C C. The battery is constructed with alternate circles or layers of sheet copper and sheet zinc. The circles of copper are connected at D, and the circles of zinc at E. These connections terminate in thimbles, in which mercury is placed, to cover the ends of the copper wires, and connect them with the magnet.

The poles of the battery B B are made of round soft iron, bent in the form of a horse-shoe, and then wound with six coils of copper wire, covered first with oiled silk, and terminating in thimbles, as seen at F F. If the battery A be now placed in a jar of water in which a mixture of sulphuric and nitric acid has been poured, the acid begins to act upon the circles of copper and zinc, and the two latent forces being liberated by this action, are attracted separately along the opposite wires to the poles of the battery. The pole which is connected with the copper circles will be positive, and that connected with the zinc will be negative.

Iron and steel rings, discs, and iron and steel of any other form can be magnetised on the poles of such a battery, and one or more poles communicated from them to these metallic instruments, and from these to others.

In pursuing the investigations which resulted in an entire conviction of the necessary existence of a pole in the centre of the brain, strong suspicions were excited of the existence of a secondary pole, in each lobe of the cerebellum, from the direction of the fibres to their ganglions, and from the manner in which they radiated from them, and also of the existence of a secondary pole in each of the anterior lobes of the cerebrum, from the convergance of the convolutions, on one side, and their prominence on the other, in the organs of casuality ; fig. 20.

The brain and cerebellum would then, if these suspicions were well founded, present the phenomenon of a strong pole in the centre between its middle lobes, and in the third ventricle, and four secondary poles in its circumference ; and as no example of such an arrangement of poles could be found in the whole range of the science of magnetism, it rendered such an arrangement of them in the brain improbable. A disc of saw plate, however, eight inches in diameter, and the tenth of an inch thick, with a round hole in the middle, of an inch in diameter, which would represent a

FIG. 21

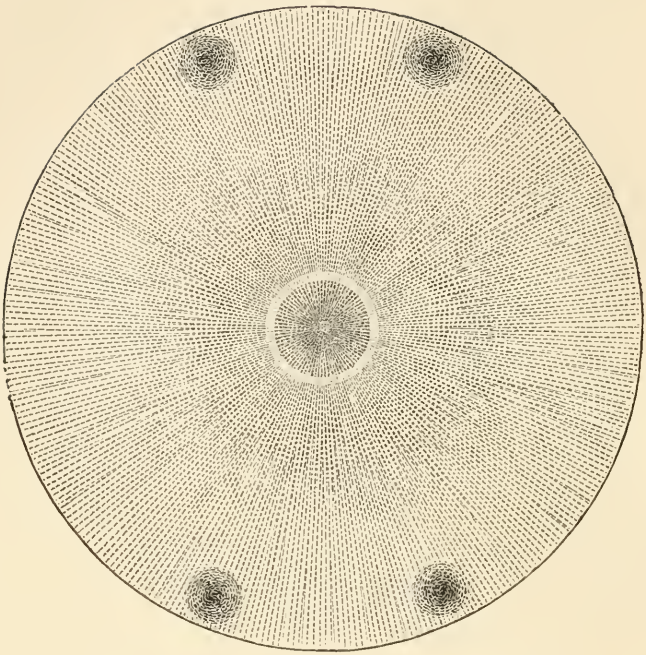


FIG. 22.

middle horizontal section of the brain, was now submitted to actual experiment, in the following manner :—

The middle of the plate or disc was carefully let down in a perpendicular direction on the middle of the positive pole of the galvanic battery, and after having remained there a moment, was raised from its position in a perpendicular direction, turned over, and the opposite side of the plate placed upon, and then removed from the negative pole of the battery in the same manner.

The plate was then covered with white paper, and fine iron filings were strewed over it, through a fine sieve, when they were immediately arranged by the forces in the plate in the manner seen in fig. 21.

This experiment was repeated eleven times on plates of from four to fifteen inches in diameter, and always with the same result. It may therefore be inferred to be constant. It presents the double phenomenon of a strong pole in the centre of the open space, in the centre of the plate, and four secondary poles or satelites in the circumference ; corresponding precisely with those before traced in the brain and cerebellum.

On applying the dipping needle to these poles, they were found to be of different denominations. Those in the circumference at *c c*, were found to be positive, and those at *d d* negative poles. When, however, the order of magnetising on the different poles of the battery was reversed, the character of the pole in the centre was changed from a positive to a negative pole, and the positions of the positive and negative poles in the circumference were also changed; the positive occupying the positions of the negative, and the negative those of the positive poles, as seen in fig. 22. The secondary poles in the circumference of the brain must be, therefore, of opposite denominations, in the order of those seen in the disc.

The magnetic axis of the positive and that of the negative secondary poles, cross each other in the centre of the open space in the inside of the disc, each forming two sides of an inverted plane triangle, the base of each of which, from the form of the disc, necessarily forming a spherical side of a triangle, and as the latter is in the circle of the disc, and as this disc is a middle section of a hollow sphere, it necessarily follows that when a hollow sphere or body, more or less round, is magnetised in the same manner, inverted cones are formed. For as the disc is a middle section of a sphere, so are the plane and spherical sides of the triangles middle sections of inverted cones.

The diverging and converging forces of the pole in the centre of the disc, act constantly on the same kinds of forces of the secondary poles in its circumference, according to their laws, in a contrary direction, and consequently arrange the magnetised iron filings, around the latter in circles, as seen in fig. 21.

On a careful measurement of the angles of lines, drawn from the centre

of the secondary poles of one denomination, in one hemisphere, to the secondary poles of an opposite denomination, in another hemisphere, from the median line between the two hemispheres, in well formed brains, they were found to correspond very nearly with the angles of the magnetic axis in the disc, from a line drawn from a to b, fig. 23. (See AAFF, fig. 5, DD *s s*, fig. 10, and BB CC, fig. 16.)

FIGURE 23,

The brain is seen placed on its base, and laid open by an incision along the median line, through the corpus callosum, the substance between the great superior and great inferior ganglions of each hemisphere, and medulla oblongata. The primary bundles of fibres of the cerebellum cut away, to show its ganglions and vegetative structure; and a part of the anterior portion of the brain also cut away, to show its fibres, cut at right angles with their direction.

BB, Anterior portion of the brain.
CC, Ganglions of the cerebellum.
EE, Corpus callosum.
A, Third venticle.
*a a*, Anterior quadrigeminal bodies.
*c c*, Posterior quadrigeminal bodies.
*t*, Connection of posterior quadrigeminal bodies.
*c*, Connection of the great sympathetic nerve.
*d d*, Division of the striated bodies into two parts, to show the passage of the great bundles of fibres, *b*.
*s*, Pineal gland with its anterior cords.
*m*, Interior of fourth ventricle.
*n n*, Great inferior ganglions.
*p p*, Great superior ganglions.
*x x*, White fibres in fourth ventricle.
*v*, Posterior commissure.
*r*, Middle or soft commissure.
*o*, Anterior commissure.

SECRETING SYSTEM.

I have in the previous part of this chapter given a concise view of the motive system, which was formed for the purposes of motion. The excretions, it will have been seen, are attracted from the blood and then repelled from the body. On a farther examination of the human structure,

FIG. 23.

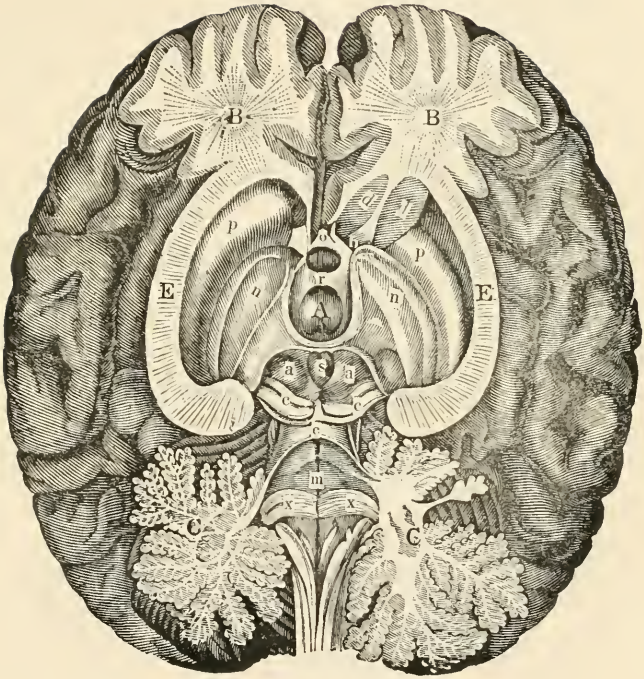


FIG. 24.

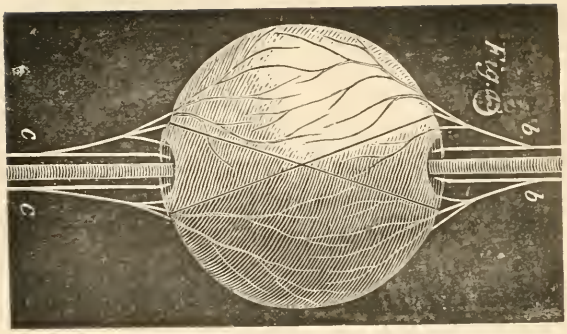



FIG. 26,

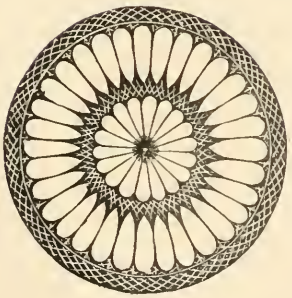
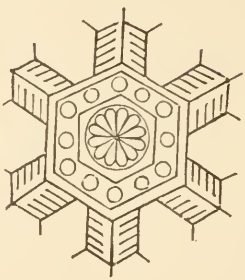


FIG. 25.

FIG 27.



we find another system in which chyle is attracted from the mass in the intestines; lymph, from the lymphatic glands, and fluids from the stomach as well as from every other cavity of whatever size or kind in the whole structure, and conveyed to the heart. We find, therefore, one formative system in which the fluids are attracted to the centre of the body, and a motive system by which they are repelled from it.

The existence of such a system as this is indispensible, not only to furnish the fluids necessary for the support and growth of the body, but to supply the waste of those that are necessarily repelled from it, to maintain its different surfaces in positive and negative states, for the purposes of motion.

This system consists of a vast number of minute vessels taking their origin with patulous or expanded orifices in almost every part of the skin, serous and mucous membranes, and in nearly all the most minute, as well as the largest cavities of the body. They unite and increase in size as they advance from these surfaces and cavities, in two divisions, one from the upper, and the other from the lower part of the body, and at length unite with two large veins very near the heart called venæ cavæ. In their course to these veins they pass into and then out of a great number of glands, varying in size from that of a very small seed to a large bean, which attract from the blood and mix with the fluids in these vessels a semi fluid called lymph, and are hence called lymphatic glands. When these are viewed through a magnifying glass, we can see the vessels and the nerves *b b* and *c c*, penetrating the gland on one side and passing out of it on the other, as seen in fig. 24.

The lymph secreted by these glands is very thin, under the influence of the natural temperature of the body in health, but when it is reduced the lymph becomes more or less thick, according to the amount of the reduction, and its motion in these minute vessels become more or less difficult. Some of these vessels become entirely obstructed in this way, and the lymph secreted by many of these glands, is accumulated in them in consequence of these obstructions by which the glands themselves are expanded.

By these accumulations the glands are sometimes enlarged in various parts of the body, to the size of that seen in the figure, before they cease secreting, when the accumulated lymph begins to harden down, and sometimes in a few weeks or a few months becomes as hard as old cheese, and looks, as well as cuts like it. On opening the gland with a scalpel in this state, its interior presents a beautiful conglobate arrangement of the acini, as seen in fig. 25, and as the same is seen through a magnefying glass, fig. 26.

The organization, it will be seen, is geometrical, and constitutes a beautiful comparison with the conglobate form of snow, as seen through a mi-

croscope, ( Fig. 27,) constructed geometrically in the atmosphere with the same forces that produce motion in the gland. They are no doubt magnetised bodies, having, like the brain, a pole in the centre and four satelites in their circumference.

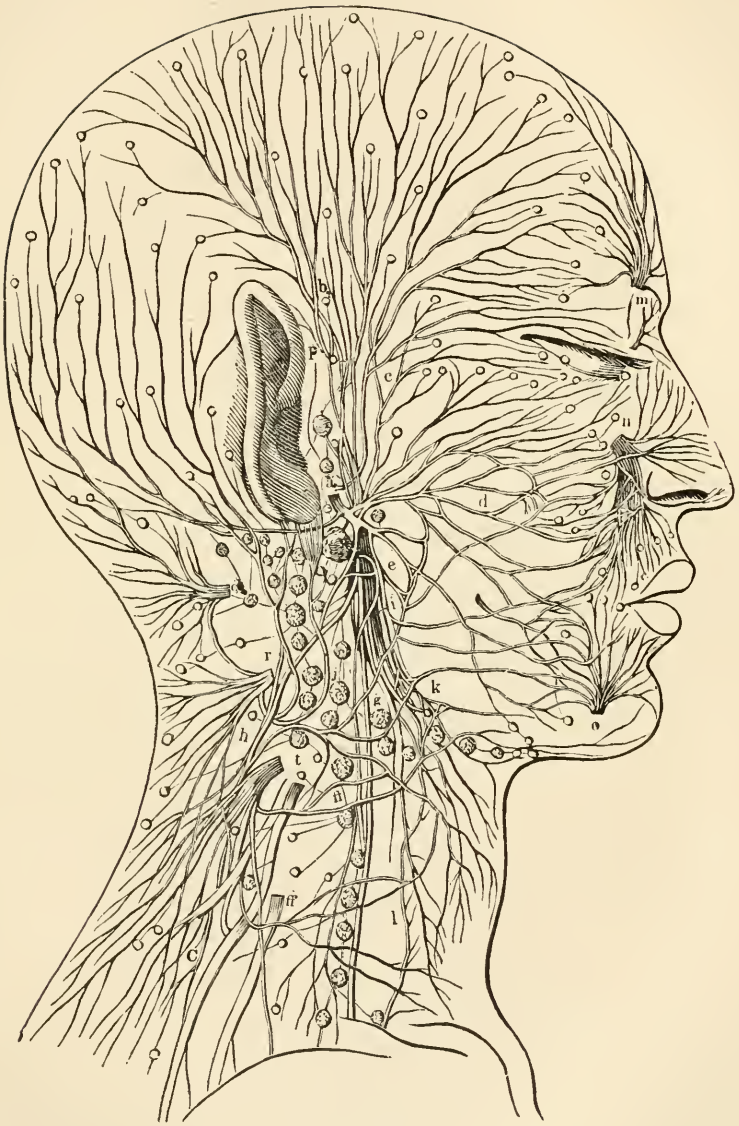
There are two classes of these glands, in regard to size and situation, which are connected with the brain, through the spinal cord, by the nerves of sensation, while the mucous glands of the mucous and mucoserous membranes are connected with it, through the same channel, by the motor nerves or nerves of motion. The lymphatic glands of the largest class are situated in places near the structures to which they belong, and are called by different names, according mostly with the names given to the places in which they are found, while their satelites, with which they are connected, or those of the smallest and most numerous class are situated in the substance of the structures.

The thymus gland of the first class is situated under the sternum or breast bone,—assists in the office of secretion for the infant, and disappears at an age when every other part of the animal system becomes perfectly developed. The pineal gland is situated in the brain, glandula concatenatæ or series of glands in the neck, the thyroid gland upon the cricord cartilage in the lower and front part of the neck, the bronchial around the bronchial tubes, the cardiac near the heart, the axillary in the armpits, the dorsal along the dorsal, and lumbar along the lumbar vertebræ, the mesenteric in the mesentery, the pelvic in the pelvis, the sacral in the sacrum, the inguinal in the groin, and popliteal in the ham, &c.

The series of these glands along the neck with some of their satelites, together with the principal nerves of the neck and face, with which they are connected, and which continue along the whole length of the spine under the names of dorsal, lumbar, and sacral glands, before noticed, may be seen in fig. 28.

*a*, Porta dura of the seventh nerve.
*b*, Branches ascending along the side of the head.
*c*, Branches to the eyelids.
*d*, Branches to the muscles which move the nostrils.
*e*, Branches to the side of the neck and throat.
*ff*, Connections formed with the cervical nerves.
*g*, Par vagum, or pneumogastric nerve distributed to the larynx, lungs, heart, stomach, &c.
*h*, Spinal accessary nerve.
*i*, Ninth nerve or lingualis.
*j*, Sympathetic nerve.
*k*, Laryngeal nerve.
*l*, Recurrent laryngeal nerve.
*m*, Frontal nerve, a branch of the fifth

FIG. 28.



*n*, Superior maxillary nerve, a branch of the fifth.
*o*, Mandibula labialis, a branch of the fifth.
*p*, Temporal branches of the second division of the fifth.
*q*, Sub occipital nerve; the first of the spine.
*r*, Second cervical nerve.
*t*, Third cervical nerve.

On an examination of the fluid that has passed through the lymphatic glands on its way to the heart, with a magnifying glass, it is found to contain a great number of minute round bodies of a white or milky color, which are accumulated in the blood and form its globules. And as every part of the body is found to be made up of minute round bodies connected together by connecting substance, there can be no doubt that they are formed in these conglobate glands, after the pattern of their acini.

These positive secretions, with the chyle from the intestines, are attracted to the heart, and then repelled from it through the arteries to be deposited for the renewal and growth of the body, as well as for supplying the excreting system with the necessary fluids for excretion, and the secreting system for secretion.

A full and constant supply of these secretions or round elementary bodies and connecting substance, was necessary to maintain the body in a healthy state, and as the supply through these glands was liable to interruptions from various causes, a large organ, called the spleen, was constructed with acini to secrete the same fluids, and furnish at all times the necessary quantities for the exigencies of the body.

We sometimes eat, and at the same or other times, drink more than is necessary to supply the wants of the secreting and excreting systems, or more than they can secrete or excrete; and as this excess or superabundance must, with that which was necessary, be attracted into the circulating mass of fluids, it was necessary to have other organs to separate the excess of positive and negative matter; for under other circumstances the body would be soon overloaded with matter, and motion would consequently cease.

The liver was therefore formed to separate the superabundance of positive, and the kidneys the superabundance of negative matter.

The positive matter thus excreted might be, and is accumulated first in a cistern or gall bladder, and then conveyed through a tube into the intestines, and mixed with other positive matter there; but it would not do to have the negative matter excreted by the kidneys, and accumulated in its cistern or bladder, conveyed through a tube into the intestines, because it was necessary to keep them constantly covered with positive matter, and it was consequently conveyed to the surface in another direction.

Plants have a similar secreting system; the fibrous or hairy roots of

plants are vessels with open orifices, through which nutritious matters are attracted from the earth to the bulbs or poles of their roots, and are thence repelled in other vessels through the whole of the cellular and vascular tissues of the plant, terminating in the vasa propria and conglobate glands, which secrete the peculiar fluids of the species.

These fluids are magnetised and changed from the positive to the negative state in the leaves and buds or lungs of the plants, which attract and repel the air through appropriate tubes, and are then attracted to their bulbs to be again repelled from them as before, and deposited for their nourishment and growth.

Plants have also an excreting system in their skin or bark, as well as in membranes, similar to those of animals, and while those on the surface are maintained like those of animals in a negative state, those of their internal surfaces are maintained in a positive state. Their excretions from their globate glands in the bark and membranes, are like those of the different species of animals different in different species.

The calyx and stalks of the moss rose, as well as of many others of the same species, are more or less covered with prominent glands, from which is repelled an aromatic fluid.

Their fragrance or perfume, and that of the different kinds of willow, with the geraniums, as well as other nectariferous flowers of the higher orders of plants, are like those of the higher orders of animals, the productions of their excreting systems, and form, like theirs, a delightful contrast with the disgusting odors from the same systems in the noxious and lower orders of the vegetable, as well as of the animal kingdom.

# CHAPTER IV.

## SENSATION AND MOTION.

The form and developement of the convolutions of the brain differ more or less, not only in the different hemispheres, but in different individuals, like the different forms of the body, head, ears, eyes, and nose.

The nerves are connected with the brain, medulla oblongata, and spinal cord by a broad base, (Fig. 3, p. 24; fig. 4, p. 25; fig. 5, p. 42; fig. 10, p. 48; fig. 16, p. 69,) and with the convolutions, skin, membranes, and muscles by fibres or small filaments. The nerves are therefore the cords of communication between the convolutions, skin, membranes, and muscles, and are good conductors of the megnetic forces, while the other parts of the body are non-conductors of these forces, and these are precisely the necessary conditions and arrangements for the purpose of accumulating these forces in the centre, and a knowledge of the sensations in the convolutions in the circumference of the brain.

The elements of sensation are produced by a modification of the magnetic forces in the ganglions of phrenic life, and are repelled to the skin and serous surfaces of the body by one set of nerves of sensation, while the sensations, produced in the skin and serous surfaces, are attracted to the convolutions by another. These ganglions were consequently distributed to the proper situations to produce such results.

If we divide the posterior branch D, of the spinal nerve B, fig. 4, p. 25, or a branch of the nerve, sensation ceases in the part to which it is distributed, but the power of motion continues the same as before. If, however, we divide the motor branch of the nerve C, the power of motion ceases also. So if we first divide the branch C, or any of its branches, the power of motion ceases in the part to which it is distributed, but

sensation continues the same as before. They are therefore the nerves of sensation and voluntary motion, and are common to all animals from the worm up to man. By them we feel and move,—feel pain and pleasure, and recede from one or advance to the other, according to the inclination excited by the sensation.

Inclinations, agreeable or disagreeable, are concomitant of and belong to the opposite qualities of the sensations, like the expansions to the repulsions and the contractions to the attractions, and they follow them in the same order.

Sensation, inclination, motion, and form are then, in this order, the attributes of these male and female forces, and are the agents by which all nature is formed and animated; by which the stars, sun, earth, planets, and their satelites were formed, animated, and are moved in orbits with unerring precision, and by which all the orders, genera, species and varieties of the vegetable and animal kingdoms were formed with a precision, and adorned with a beauty that defies imitation.

Nothing can, therefore, equal the adaptation of these forces to produce such results; for besides their unlimited power, which can make a world tremble like a leaf, the great velocity of their motions and their great and almost inconceivable tenuity, enable them to penetrate the most minute orifices, and construct an infinite variety of bodies of every form and size, and produce motion in the smallest with the same geometrical accuracy as in the largest structures.

There are thirty-nine pair of nerves distributed through the body, for different and specific purposes; and as an organ is supposed to be required for the fulfilment of each, there must be in that case thirty-nine organs of the brain and cerebellum, including the eyes, nose, and ears, and is supposed to be a maximum number which necessarily places man at the head of the animal creation.

Observations by Dr. F. J. V. Broussais, Member of the Institute of France, Professor to the Faculty of Medicine at Paris, &c., &c., on the Organ and Propensity of Amativeness. Extracted from his Cours de Phrenologie. Bailliere, Paris and London, 1836; 8vo., p. 164.

"Professor Broussais, after describing the cerebellum and the functions ascribed to it by Dr. Gall, whose opinions he adopts, as being supported by his own observations, proceeds, on page 164 of his *Cours de Phrenologie*, as follows:—

The *vivisectors*, or those who practise experiments on living animals, have considered the cerebellum as the regulator of muscular movements. They found on the assertion, that when the cerebellum is injured by cut-

ting slices out of it, the muscular movements become disordered, the animal can no longer direct them according to its will, or according to the end which it appears to have in view; but similar results are obtained when sections are cut away from the base of the brain, towards the quadrigeminal tubercles for example; in a word, at the points where the principal nerves of muscular movement unite.

I acknowledge that I do not comprehend the meaning of the function ascribed to the cerebellum, expressed in these terms—*the regulator of muscular movements*. In aid of what faculty does the cerebellum regulate these movements? Is it for the intellect, for the will? This is not proved. The will regulates motion in the infant as well as in the adult, in the eunuch and in the entire man; and yet the cerebellum differs much in these different cases. I know that it may be alleged that it executes both functions; that, in point of fact, it diminishes in volume when it no longer excites to generation, but that it preserves sufficient dimensions to regulate movements. I do not deny it to exert an influence on the voluntary movements, as will immediately be seen; I mean to prove only that this is not its sole function, and that it exerts a considerable influence on the act of generation.

Does it regulate muscular movements in reference to the fulfilment of its own functions? I believe that it does, under certain conditions. This kind of regulating power, then, would be nothing more than a prerogative belonging to it in relation to the generative functions; on this point I shall enter into some explanations. I have observed in some animals—in fowls, for example—that a blow inflicted on the nape of the neck, makes the animal draw back; makes it walk backwards sometimes for several seconds. Some diseases of the cerebellum produce the tendency to fall backwards. A young man, in whom this organ was affected, in consequence of solitary erotic excesses, felt himself inclined to draw backwards, and occasionally fell backwards. But do these facts prove that the cerebellum is the regulator of the muscles in all cases? They would rather lead us to think that this organ specially exerts an influence on the extensor muscles of the head, on those of the spine, those of the pelvis, and of the organs contained in it, which are seen to enter into great activity in the act of copulation; in short, on the muscles of which the organ makes the greatest use in executing its generative function. I can positively affirm, that the capacity for regulating the muscular movements, or manual dexterity, or dexterity of any kind, are not at all in relation to the cerebellum. I have positive evidence that men possessing a large cerebellum can be extremely awkward.

There is another organ, that of constructiveness, which appears to exert a much greater influence over the regularity of voluntary movements, and to which manual dexterity appears to belong. We shall study it in

a subsequent part of our course. The organ of resistance may be mentioned also as conducing to this effect.

Let us, however, consider a little more at length the relations of the cerebellum with the muscular apparatus of locomotion.

The brain influences all the muscles. This is a fact proved in the most positive manner by pathology and pathological anatomy. An effusion, a rupture which takes place at the converging points of the fibres of one of the lobes of the cerebellum, produces as complete a hemiplegia as that which results from effusions occurring in the *corpora striata* and *optic thalami*, which belong to the brain; whence it evidently follows that all the locomotive muscles are in communication, by their nerves, with the cerebellum. We have no reason, therefore, to be surprised that the excitement of the cerebellum convulses them, and that the compression of the same organ paralyses them. Moreover, all the muscles assist more or less in the accomplishment of the act of generation, although some contribute to it more powerfully than others. It is necessary, therefore, that all of them, without exception, should be in connection with the brain.

Let us still add a few remarks, which may assist in throwing light on the question.

We assert that, in the normal state, the cerebellum alone is not competent to move the muscles. No fact is more certain; for if the brain do not act, or if it act incompletely, the movements necessary for the accomplishment of generation do not take place. It follows that the cerebellum alone is not sufficient to execute voluntary movements, and that to accomplish this object the intervention of the brain is necessary. It may be granted, that the cerebellum excites them and regulates them when the brain acts in concert with it, and the will assists. That it induces the brain to regulate them, with a view to the fulfilment of its functions, is a fact which may be observed in many of the domestic animals, both birds and quadrupeds, in which the movements connected with generation commence whenever the individuals of the other sex are perceived to be in a determinate attitude. Every one knows that even the presence of the female is not necessary to give rise to these movements, for they commence in the dog whenever we raise it up in a certain manner. It is clear that if his brain did not act, the cerebellum alone would not execute these movements. But if the brain assist, the cerebellum will not fail to regulate them after its own manner, under the conditions just mentioned; or rather to cause them to be regulated by the will, on which it acts as an instinct. Let us add that, although the will may direct these movements in man, we must acknowledge that they are first reduced to a determinate order by the cerebellum, because it is this organ alone which excites

them in the lower animals, who cannot be taught by education, and in whom they cease to appear after castration.

I ascribe, then, the direction of the movements, the acts, the aptitudes, which have a reference to generation, to the influence of the cerebellum. But I maintain that these cannot be accomplished without the permission, nay, without the assistance, of the brain; and that it is in this sense alone that the cerebellum can be considered as the regulator of muscular action. Thus the brain always remains master of the movements of the cerebellum tending towards the act of generation, so as to be able to arrest them; and it effectually exerts this power, in a variety of circumstances, as every one knows.

You are aware that Gall has availed himself of a passage in an ancient Greek author to support his opinion on the cerebellum. But that passage is of no consideration in the present state of the science. We have much better methods of arriving at the truth. Gall has the honor of having established the proposition, as a positive fact, that the cerebellum is the primary organ of generation. In demonstrating this point, he proceeded by the method of direct or empirical observation,—that is to say, by establishing, by numerous facts, that persons in whom the posterior and inferior part of the head is much developed, and who have the cerebellum large, are more inclined to the generative act than those whose heads present a different developement.*

These observations of Dr. Gall have been subsequently confirmed by all inquirers who have studied the subject with due attention, and especially with impartiality; and phrenologists possess considerable collections of skulls and casts which support them. The evidence is so conclusive, that the generative function is ascribed to the cerebellum, but without being able to affirm that it executes no other functions.†

Nevertheless, some individuals, who are opposed to phrenology, maintain that the generative propensity has been observed very powerful in persons who had scarcely any cerebellum, or whose cerebellum had been destroyed, or in whom only the rudiments of it existed.‡ I do not know to what extent such alleged facts merits our confidence. For my own part, I declare that they will inspire me with none, until they shall have been verified by phrenologists. It is necessary to be on one's guard against facts which are attested only by the adversaries of a science, be-

* It will be observed that the question here does not relate to any action exerted by the cerebellum on the muscles, but to an impulse communicated to the genital organs.

† I have stated in most of my works, the opinion that the cerebellum also exercises an influence on all the viscera. It is known that, when over irritated, it excites vomiting, &c.

‡ It has not been said that these individuals were incapable of regulating their muscular movements.

cause it is well known to what extent the spirit of speculation may lead to falsehood in assertion. We exhibit collections of positive facts, and we daily repeat our observations. If some exceptions exist, we do not deny them, but set them down as points to be explained. It is not sufficient to shew us merely single cases; our opponents must make collections in contradiction to ours, and the histories of the individuals must be completely authentic. This has not been done, and we are justified in doubting the truth of these assertions. I defy those who advance them to produce proofs,—I shall not say *superior* to those which we exhibit, but at all *equal* to them. For my own part, whenever, since I knew the system of Gall, I have been consulted by individuals who complained of the inactivity or infidelity of the generative organs, I have immediately directed my attention to the cerebellum, and I have always found it very depressed. When children have been presented to me, who, before the age of puberty, have manifested an extraordinary propensity towards the sexual act, and who have divined the process supplementary to it, I have always found the cerebellum very largely developed. This has never failed. I defy the opponents to produce pathological facts which can be weighed in the balance against those which I possess of this description.

Dr. Gall has also remarked that diseases which irritate the cerebellum, maintain the organs of generation in a state of morbid excitement. Nothing is more true. M. Serres has made the same observation; and several other observers, worthy of confidence, have reported analogous facts. Other contradictory facts have been cited. It has been said that inactivity of the genital organs has coincided with other diseases of the cerebellum, such as scirrhous tumors and tubercles. Who does not know that chronic diseases causes organs to lose the power of exercising their functions? Even a smattering of medical knowledge is sufficient to be convinced of this truth. Thus, a disease of the cerebellum, which at first presented the characteristics of inflammation, and was attended by excitement of the muscles and of the functions of generation, may terminate in degeneration of the parts, which shall produce inertness in the organ, and destroy this excitement. The objections, then, are not of much weight. Besides, without forcing facts, without straining our ingenuity, without hunting for sophisms, who does not know that a moderate excitement of the brain exalts the movements of the moral and intellectual faculties, and that a more powerful excitement, which induces congestion, paralyses them? Why will it not be allowed that the cerebellum, when excited to a certain extent, may increase the activity of the genital organs, and that, at a later stage, when congested to excess, it may paralyse them. This should be the case; and, indeed, cannot be otherwise But the adversaries of a doctrine take advantage of all facts which appear to them to be capable of shaking its credit.

It has been said, also, that extraordinary and morbid excitement of the genital organs has taken place in coincidence, or in connection, with diseases of the spinal marrow. I can easily conceive this to be the case; because the nerves which communicate feeling and activity to the generative organs do not proceed directly from the cerebellum to them; they descend through the spinal marrow. Why, then, if the spinal marrow be irritated, should these nerves not excite the genital organs? This is very conceivable, and we see proofs of it in the interesting work of M. Olivier d'Angers, as well as in the experiments of Dr. Segalas, who has produced emissions in guinea pigs, by irritating the spinal marrow in the lumbar region. A nervous trunk, when irritated, produces excitement in all the parts on which the nervous filaments proceeding from it are ramified.

Thus it appears that all these objections are of very little importance, and can do nothing to invalidate the results of direct observations, which are constantly repeated.

Dr. Gall has been so bold as to hazard the statement that the developement of the genital organs exercises no influence on their activity; that they may be inert although very much developed, if the cerebellum be very little so. At first I refused to admit the correctness of this fact; but experience has proved to me that it is true. I have ascertained the inertness of the genital organs in man, although very considerably developed; but the cerebellum was depressed. I have ascertained also the contrary, in opposite conditions, in such a manner that I can no longer doubt. I assure you that it has not been from rashness, nor without reflection and numerous observations, that I have ventured to take up the defence of phrenology. I have multiplied observations, as far as it has been possible for me to do so, before entering the lists of its defenders.

We must, however, consider the manner in which the cerebellum acts in executing the function of generation, which appears to be its principal function. Perhaps Gall has scarcely entered into sufficient details on this subject. I shall attempt, so far as my limited ability will permit, to supply this defect.

The cerebellum certainly does not form the *ideas* connected with generation: these belong to their proper organs (in the anterior lobe of the brain). This fact is very observable in the lower animals. Many of them, whose ideas are very obtuse, nevertheless present a very powerful instinct of generation. Erotic ideas, then, must not be ascribed to the cerebellum; it is by the manner in which the latter excites the brain that it calls up these ideas in man; it keeps them up, because a relation has gradually become established between it and ideas of that kind. When the perceptions of the senses have arrived at the intellect, these perceptions become associated with the cerebellum in proportion as this organ is

increased in growth, in the same manner as other ideas associate themselves with other feelings.*

In a former lecture I have given some explanations on this point. Do not, therefore, regard the cerebellum as the immediate seat of sexual ideas, but as the organ which excites these ideas, and as a means of keeping them up and of recalling them.

The cerebellum appears to be the primitive organ which excites the organs of generation to secretion and erection at the developement of puberty. The cerebellum begins to grow large before the organs of generation develope their powers. Thus, it is the cerebellum which puts them in action, which impels them to develope themselves, and which, in short, excites them to the secretion of a prolific fluid and erection. But, at the same time, it excites the encephalic apparatus. It acts, then, in two directions; for the ideas relative to generation assume an entirely different color, when the cerebellum is developed, from that which they

* This portion of the text will probably appear obscure to readers who are not acquainted with phrenology. It may be thus elucidated. According to phrenology, the intellectual faculties alone form ideas, and they are manifested by the anterior lobe of the brain. The *feelings* are connected with the posterior and middle lobes; and the intensity of each feeling bears a proportion (other conditions being equal,) to the size of of its own special organ, and not to the size of the intellectual organs. Hence, if lascivious objects be presented to the eyes, or addressed to the ears of two different individuals, they may see them, and hear them, and understand them, with equal precision, by means of their intellectual organs, if these be equal; but if, in the one, the cerebellum be extremely deficient, the objects will excite in him a very feeble sexual emotion; while, if the cerebellum be very large in the other, they will make a deep impression, and call forth a lively interest in him. In this case, the ideas or conceptions of the objects (being equally clear in both individuals,) depend on one set of organs, (the intellectual,) which they possess in an equal degree; while the emotion (differing so widely in intensity) depends on another organ, (the cerebellum,) in the size of which they differ; in other words, it is not the cerebellum, but the anterior lobe, which forms ideas. I have found these views confirmed by many facts. For example,—those individuals in society whose delicacy is most sensitive, when allusions are made to the sexual feeling, are *not* those who have a small cerebellum, and in whom the feeling itself is most weak Such persons, although their intellect be good, are dull in apprehending these allusions when veiled; and when the expressions used are too distinct to be misunderstood, they appear to them to partake as much of the character of impertinences as of indelicacies. On the contrary, when the cerebellum is large, and the corresponding feeling is strong, in combination with large organs of the moral sentiments, which furnish purifying and controlling motives, the persons thus constituted *are extremely sensitive* to indelicate allusions. They *divine them* even when shrouded in the most studied ambiguity; they *understand their nature*, and could enjoy them, but that their moral feelings condemn them; and from this conflict and condemnation arises the *sensitiveness* of their minds in regard to such topics. When the cerebellum is very large, and the moral organs are deficient, there is a want of delicacy corresponding to the deficiency of the purifying and controlling powers. The individual is then very much in the condition of the lower animals in regard to this feeling.—*Translator.*

previously possessed. It excites the sentiments and intellect. Moreover, the cerebellum receives excitement from the genital organs depending on the double cause which I have just mentioned, secretion and erection. There is a reciprocity of action between them. Thus the sexual excitement may begin by the imagination, or by the perception of the object, or originate in the organs of generation themselves. I must avoid entering into details on this point. In the last case, as soon as the organs are excited, they communicate a stimulus either to the cerebellum, which reacts on the brain, or to the brain, which in its turn excites the cerebellum.

The cerebellum is maintained in its normal degree of developement by the continuance of the generative action. If the genital organs, the organ of secretion in particular, which is the foundation of this function, disappear, the cerebellum diminishes. Castration proves this fact: the cerebellum becomes depressed, the lower part of the head shrinks, while the other parts preserve nearly their original dimensions. When the bull is converted into an ox, the nape of the neck is observed sensibly to shrink. Nevertheless, this shrinking does not proceed so far as it does when castration has been performed before the developement of the organs of generation and of the cerebellum; and the muscular system preserves a greater volume and more energy in animals which have been castrated after the evolution of the genital organs, than in those who have been mutilated before it. This is a fact which has been often observed, and which is now turned to account. If one wishes to have a strong horse, for example, it is usual not to subject him to castration until after he has been completely developed. In this case, the falling in of the nape of the neck never goes so far as if the operation had been performed before the evolution of his generative system, although it does take place to a perceptible extent. Hence it is clear that the cerebellum preserves its normal volume as long as the genital organs preserve their action; and that, when this action is withdrawn, the cerebellum, and the muscles also, losing their activity, experience a diminution in volume.

There is another important fact which has been turned to advantage on both sides of this argument. When castration takes place in man, after the complete developement of the genital organs, he continues to form erotic ideas, while he entertains none, if the operation has been performed before puberty. Every one knows that in those countries in which their manners tolerate this species of mutilation, certain eunuchs continue to feel an inclination for the other sex when they have suffered castration only after complete developement. Those who cultivate Roman literature will recollect certain verses of Juvenal, too coarse to be quoted, in which he castigates the lubricity of the Roman ladies. He mentions that they did not mutilate the young men chosen for their baths, and with whom they intended to abuse themselves, until after the com-

plete developement of puberty. At this epoch, the cerebellum having acquired its full developement, had modified the other organs of the encephalon in such a manner that erotic ideas did not disappear completely, and that erection could still take place without secretion.

Another physiological and pathological observation appears to me to merit attention. When erotic excitement has been long abused, it establishes in the nerves of the whole generative system, in those of the neighboring organs, and even in all the lumbar and femoral muscles, a mode of action, accompanied by a kind of sensation which tends to pass from pleasure into pain, and which, for want of a better phrase, may be named *une volupte douloureuse*. This perversion of sensibility does not cease to make progress, and ends in a considerable diminution of the muscular vigor of these regions. The species of semi-paraplegia which results from it is generally incurable.

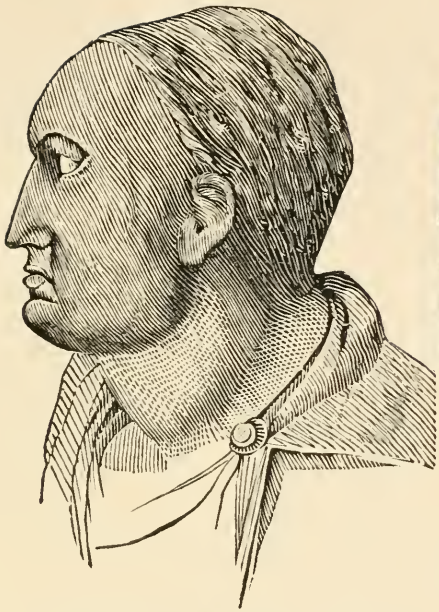
I shall now exhibit some specimens of the cerebellum. In this head (shewing a cast to his audience,) there is an enormous developement of it. The distance between the two ears is prodigious, even disgusting and repulsive, from the resemblance which it bears to a brute. This man was guilty of several crimes against chastity in England, each more abominable than another, which forced him to go into exile. You will observe also that those parts (at the sides of the head,) where the selfish propensities are situated, surpass in developement all the other regions of the encephalon, and greatly exceed the intellectual organs in size. No controlling power opposed the action of the organs which produced his crimes. You have here (showing other casts,) examples of the cerebellum much developed in men who possessed distinguished intellectual faculties with elevated sentiments, and their high reputation proves that the generative instinct never led them to reprehensible actions. Here again is the head of a man who was passionately devoted to natural history, and curious in collections. He was very fond of women. You observe that the cerebellum is very much developed ; but the higher faculties are very powerful, they were cultivated, and the honorable recollections which the *savant* has left behind him, shew that the organ of generation did not reign despotically over his conduct.

The same observation applies to the head of Gall,* and to many others which it is unnecessary to present.

Here, again, is the head of Pigault-Lebrun, whose romances partake largely of the erotic quality, but, after all, are not gross. You see in this other head the perceptive organs well developed, much self esteem and love

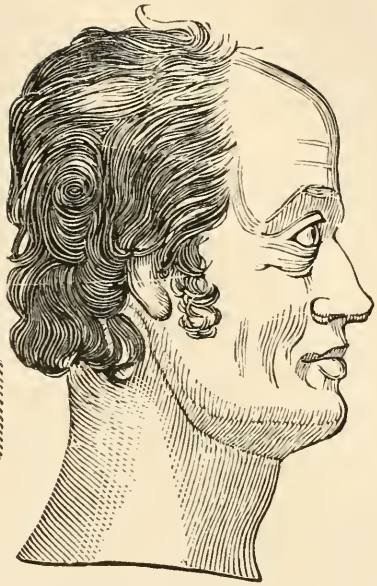
* The cerebellum was largely developed in Gall, and although the feeling did not subjugate his intellect, it produced irregularities of conduct which were reprehensible.—*Translator.*

NERO.



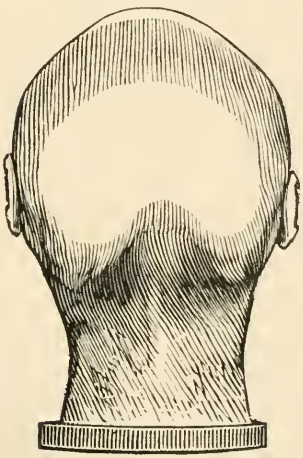
CEREBELLUM VERY LARGE.

DR. GALL.



CEREBELLUM LARGE.

AARON BURR.



CEREBELLUM LARGE.

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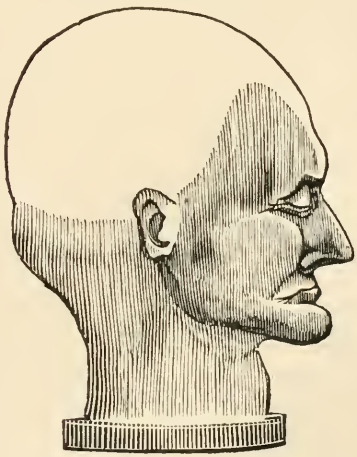

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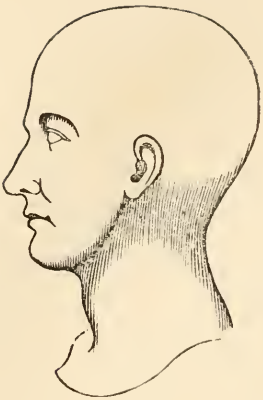
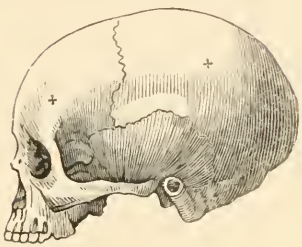
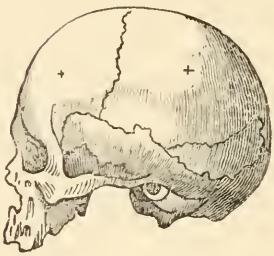


Cerebellum moderate.

Cerebellum small.

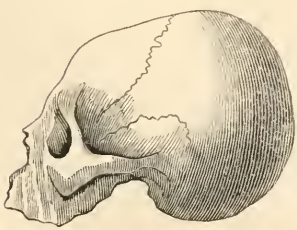


Cerebellum moderate.

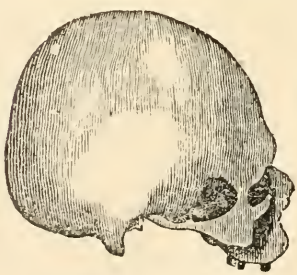


Cerebellum very small

Bust of the skull of a murderer.



Cerebellum large.



Cerebellum very large.

of approbation, in a word, organs capable of guiding the action of the cere bellum. I wish you always to study the organs in this manner, I mean in their mutual relations. I could greatly multiply these observations; but as we are obliged to take our examples from persons who are well known, to inspire the greater confidence, one feels a delicacy in bringing too many forward.

I shall now shew you several examples of an opposite description. This head is that of a mathematician who felt aversion to the sex, and was never married. He has the reputation of having remained in the virgin state. Here is another whose condition was precisely the same. You may easily conclude that their actions were dictated by those regions, which you perceive to be predominant, the anterior and superior, and not by the posterior region, the depression of which is strikingly conspicuous.

I here shew you the head of Bontillier, a brigand. He was abandoned from the first to all sorts of vices, and at last degraded by the crime of parricide. You observe the enormous developement of the posterior and lateral regions, and no adequate powers of control in the anterior lobe. He was besides uneducated. There is always a deficiency in the developement of the controlling organs in those men who have been guilty of disgraceful crimes in relation to the cerebellum.

### AUXILLIARY FACULTIES.

After these details, I shall notice the organs which favor the action of the cerebellum, and those which tend to repress it. I shall follow this course in examining all the other organs, wherever they admit of my doing so. The organs which favor the action of the cerebellum are those of the soft affections, of friendship and attachment, and especially those of the love of children, imitation, the sentiment of mirthfulness, ideality or imagination, a considerable activity of the perceptive organs, particularly of music and of benevolence. All these, to use a vulgar expression, lend strength to temptation.

### ANTAGONIST FACULTIES.

The feelings and intellectual faculties which act in a contrary direction to the cerebellum, are rage, hatred, cunning, and circumspection; because these last organs force men to reflect, and during reflection the activity of the instinct of propagation diminishes. The organ of acquisitiveness may be added; almost all misers are indifferent to sexual pleasures. This is a remarkable fact. One of the greatest enemies of this

function is shame, combined with a want of self-confidence, especially when these two are remarkably strong. Want of self-confidence produces much relative impotency; that is to say, impotency which exists only in certain circumstances, and which may occur with a sufficiently vigorous generative power. I assure you, without hesitation, that I have been much assisted by the system of Dr. Gall in my diagnosis of anaphrodisia (the want of the generative power.) I easily recognise the individuals in whom the defect of power is relative merely, caused by the want of courage and self-confidence, combined with a large developement of the organ of credulity (wonder). Such are the men who are made to believe that their scrotum is tied,(qu'ils ont l'aiguillette nouee,)words which may be paraphrased by the expression, that they labor under *relative impotency.* The opposite conditions are not less striking for the observer; for the men who have abundance of self-conceit always act up to their means, whatever these may be. It is, therefore, not without cause that coxcombs, presumptuous persons, and even fools, are renowned for their success with the fair sex. It is curious to trace the relations of these vulgar opinions to the anatomy and physiology of the brain.

On the other hand, and in regard to the influence of the intellect, it is not the less certain, that the generative power is enfeebled by the sustained exercise of reflection, by abstract researches into causation, and by meditation; by the excessive study of mathematics, and by all those kinds of labor which tend to call the nervous energies towards the organs of thought situated in the anterior lobe. An excessive developement of the organs of order and weight are not favorable to the functions of the cerebellum. Men extremely formal, regulated, and methodical, experience in these dispositions a kind of counterpoise, which preserves them from excesses to which, otherwise, this organ would prompt them. At the same time you will bear in mind that the organ is sometimes so predominant that it overcomes all these obstacles; but unless it is so to a great extent, it may be guided by these other powers. The effect of these influences may be observed in both sexes, but more particularly in women, for whom, in general, celibacy is less distressing than for men. In a word, all the feelings which tend to egotism, (according to Dr. Sarlandiere, who admits a group of this nature,) all the faculties which dispose to reflection and meditation, furnish checks against the abuses of the organ of generation; while gaiety, dissipation, pride, presumption, imagination, and intellectual idleness, all contribute to increase its activity.

An extremely large developement of the cerebellum tends to produce excesses, of which the following are the consequences: These excesses induce exhaustion of the nervous energy more efficaciously than the extraordinary activity of any other propensity, because the act of generation partakes to some extent of the nature of a convulsion. It weakens pro-

digiously the locomotive power, and at the same time the vigor of the intellectual faculties, in such a manner that it is one of those functions, the excess of which is the most prejudicial to the individual. A multitude of diseases are the results of its abuse, and especially convulsive affections, disturbances of circulation, and derangement of digestion. Its moral effects are disorder in affairs; for such excesses induce stupidity, or at least a deplorable indolence.

These consequences should not be lost sight of in education. Those young persons who feel themselves in danger of being overcome by this propensity, should betake themselves, in due time, to the corrective influences which we have pointed out, if they do not wish to expose themselves to moral and physical degradation, and abridge the course of their existence.

### DEFECT OF DEVELOPEMENT.

The effects of deficient developement of the cerebellum may be mentioned. This defect weakens the benevolent affections: we have already remarked that the malevolent affections tend to depress the generative functions. Defect of the cerebellum permits the egotistical sentiments to assume the ascendancy. The best judges of human nature desire always to see this propensity rather a little too vigorous than too weak. It then exercises a favorable influence on the benevolent affections. This fact is certain. Eunuchs afford evidence of it. The selfishness of these beings is proverbial. In our day they do not act important parts in public affairs; but history presents us with examples of eunuchs who were ministers of state, generals of armies, in a word, distinguished personages. Almost always, egotism, coldness of heart, defect of benevolence, and jealousy, have characterized them.*

* The doctrine in the text appears to be rather vaguely expressed. The organ of amativeness never produces, as its proper function, any other feeling than that of love between the sexes, and it is not, therefore, a generous or moral propensity. Its direct object is the gratification of the being who experiences its impulses. It exercises, however, an extraordinary influence in exciting to activity all the other organs with which it is combined; but there is no preference, in this respect, in favor of the moral organs. If it be large, and be combined with large moral organs, it will stimulate them into activity towards the opposite sex, and a young man will then become chivalrously kind, good, and brave, in every thing regarding women. Its influence will be the same in the case of the opposite sex. They, under the influence of a similar combination, will be kind and generous to men. The extraordinary interest which some women feel in boys, out of all reasonable proportion to their love of girls, arises from the same combination.

But if the same degree of the organ of amativeness be combined with deficient moral, and large animal organs, it will stimulate the latter, and the unhappy possessor of this

*Depraved manifestations* of this propensity have much less reference to the predominance of the cerebellum than has been generally believed. This species of corruption is owing rather to the deficiency of the moral and intellectual faculties. It is favored by bad education, by example, by the sequestration of the sexes. Certain other propensities may contribute to it, such as the love of children, for these affections are nearly related. The propensity, in some persons, to enjoy their own sex may also, according to some late observations, occasionally bear reference to the individual himself possessing several feminine qualities. It is suspected, for example, that the taste which prompts a man to substitute one of his own sex for a woman, proceeds from the predominance of some organs peculiar to woman, particularly in the passive object. In like manner, the analogous vice in females, supposes a woman who possesses masculine qualities by the configuration of her brain. These ideas are not my own. They were communicated to me by a phrenologist, an accurate observer, who will publish them by and bye. I am far from appropriating them. They are very interesting ; because it is repugnant to reason to ascribe to the generative propensity, which has such a determinate and direct object, as the approach of the two sexes, disgraceful vices, that degrade men without realizing the object intended by nature.

The generative instinct acquires vigor by exercise, if the act has not been carried so far as to exhaust the strength and deteriorate the organs. It is weakened by inactivity. This fact is easily proved by observing Cenobites and all persons who live in celibacy. After having painfully resisted the propensity in youth, both sexes at last become entirely masters of it, to such a degree as scarcely to feel its existence at an age at which those who have been in the practice of exercising it moderately, still enjoy decided powers of reproduction.

These remarks accord perfectly with the previous observations which I made relative to castration. We state that the generative organ long maintains its activity in the male sex, when it is properly exercised, provided no organic affection exist in the *vicera ;* while it decays in the opposite conditions.

combination will become only the more sensual, brutal, selfish, and ferocious, the more he is governed by his cerebellum. This power of the cerebellum to excite the organs of the animal propensities, where these predominate, explains the atrocious murders which some men commit on the victims of their sexual passion, not only in the fury of storming besieged towns, but in cool blood. Many years ago I saw a man and woman walking on the brink of the precipitous rock which forms the western front of Salisbury Craigs, near Edinburgh. A few minutes afterwards I heard an alarm, and saw the body of the woman lying at the foot of the sloping bank below the rock, dashed to pieces. Her paramour had pushed her over the precipice to avoid the consequences of his illicit love. He escaped down the slanting side of the hill, and was never afterwards heard of.—*Translator.*

I have treated of this function at considerable length, because it is very important, and phrenologists in general ascribe to it a high rank. It is, indeed, the most indispensible of all, for it leads to the preservation of the species; p. 187.

## CHAPTER V.

APPLICATION OF THE MOTIVE POWER OF THE HUMAN SYSTEM TO DETERMINE THE CHARACTER OF A LARGE CLASS OF CHRONIC DISEASES.

The motion of the magnetic forces, along the spinal nerves, furnish us with the means of distinguishing, with great fecility and perfect precision, a large class of chronic diseases of the organs and limbs.

This class of diseases, often mistaken by the best physicians, and known by the general name of tubercular disease, attacks and consigns, to a premature grave, its millions, every year, of the most amiable and talented portion of our race ; and as these symptoms are believed to be of great importance both to the physican and his patients, I shall select and copy here, from my Case Book, a few cases in which these magnetic symptoms were practised, to show the ease and certainty with which the disease is now distinguished.

Mrs. J. P., of good constitution, light complexion, and naturally full habit, aged 22 years.

Called to see her January 11th, 1835. She has a swelling on the right side of her neck and face, which commenced about the 10th of November last, and has been out of health about three years.

Suspecting tubercula, and without making further inquiries, and in the presence of a number of gentlemen and ladies, I commenced an examination of the lymphatic glands along both sides of the spine, and first with those of the first cervical vertebræ, and pressed with the finger upon one lying close to the right side of the vertebræ, and of the size of a very small bean, which produced a scream from severe spasmodic pain, which, on every repetition of the pressure, darted violently and with the rapidity

of lightning into the external cervical and submaxillary tubercles, and into the upper jaw, ear, and right side of the head ; and on her complaining of its darting also into her throat, I examined it, and found two tubercles rising conspicuously in the right tonsil, and one in the gum of the upper jaw, all of which were very sore, and also painful under pressure. I now applied pressure in the same way to these cervical and submaxillary tubercles on the side of the neck and the under jaw, which produced the same kind of pain in them, which, at every repetition of the pressure, darted violently along the neck and under the clavicle into the upper portion of the right lung. I now applied pressure to the left side of the first vertebra, on a still smaller tubercle, and she screamed again, and pointed her finger to the spot *the pain darted to*, on the upper portion of the left side of the neck, and on examination I found there a large submaxillary tubercle, and on applying pressure to this, the scream was again repeated, and she at the same time applied her hand to the left breast or mamma, and then pointed out the course of the pain from the tubercle along the neck and under the clavicle into the breast. I now examined it, and found it every where literally crammed with tubercles of the size of peas ; breast one-third larger than the right; color of the skin natural. The other breast flaccid every where, and neither gland or tubercle to be felt in it or in the axilla of the left side.

The small tubercles along the right side of the other cervical vertebræ were sore or tender, and pressure on the upper ones sent darting pains into the right side of the neck, and on the left side of the lower one into the region of the heart, and checked her breathing. Pressure applied now on the sides of the first, second, third, and fourth dorsal, produced pain which darted into the stomach ; and on the second, third, fourth, and fifth lumbar, produced the most severe spasmodic pain, and darted violently into the uterus. Pressure on the sides of the other vertebræ produced no pain or effect whatever.

I now inquired at what time she first discovered tubercles or swellings on the side of her neck? She answered, about the first of June, or the first of July, her attention was first directed to one on the side of her face in front of the ear, that was very sore, and at times painful, and that at such times there was "soreness along the chords" of the neck, but "never thought of examining there for tubercles." I now told her she must have white swellings of some of her joints or limbs, besides that of the neck and face, when she presented her left arm permanently flexed in an obtuse angle. On removing the clothing from this arm, it presented a white swelling of the elbow joint and arm. The swelling of the arm was united to that of the joint, and extended more than half way to the shoulder, and there was plainly felt along the under side of this swelling, or under and inner side of the arm, a large or wide ganglia of tubercles,

extending from the elbow six or seven inches above it. These tubercles were of the size of peas, near the elbow, but became gradually smaller, and of the size of small seeds where they were lost in the upper part of the swelling.

I inquired now, whether she had any other swellings about her, when she answered, " no, that's all," but I told her it would not do,—she must have white swellings of the limbs and joints of the right side, as well as of the left; and after viewing me for a moment with an expression of hesitancy, she began to make preparations to show me her right leg. It was swelled from the ankle to the knee, and had an elastic and puffy feel, and I plainly felt along the front and sides of the tibia, small tubercles from the size of small seeds to that of a small pea. She now told me she would show me the other one. It was swelled, and in all respects like that of the right leg.

Diagnosis, tubercula of the uterus, both legs, left arm, left breast, heart, stomach, right lung, cavity of the ear, right lobe of cerebellum, right side of the neck, upper jaw of right side, and right tonsil.

On applying the stethescope to the region of the heart, I found its action strong, and it appeared to strike hard against the ribs, but its sound was subdued or muffled, and its action was felt and heard under the clavicle of the right side, very nearly as plain as in its own region, but could hear it very slightly under the left clavicle, and left and right side of the back. The respiration was natural in every part of the chest, except in the upper portion of the right lung, where it was very slight, and at times inaudible. Diagnosis by stethescope. Hypertrophy of the heart and tuberculated upper and front portion of the right lung.

I now inquired into the history of this case, which is as follows:—

The disease commenced about three years since, when she was living in Cincinnati, and soon after an attack of cholera, with the usual symptoms of chlorosis. Her catamenia commenced when she was fifteen, but appeared but twice during that year, and only two or three times a year since that time, and then only from the influence of medicine, up to the first of December, 1833, when she was married.

Previous to her marriage, they had been absent eleven weeks, but appeared in a day or two after, and have reappeared since that time oftener than before, in a proportion of about two to one, but have always been very slight or small in quantity. About three years since, a discharge commenced from the uterus which was adhesive, and of a white or milky color, and after a few months became of a yellow color, with cheesy matter or flocculi, and has continued to this time. Her feet and ankles began to swell about six months after the discharge commenced, and about a year from that time, her legs began to swell and be painful. Her back became very weak soon after the discharge commenced, and has continued

so to this time, and she has frequently more or less pain along the lumbar vertebræ. About the middle of December, 1833, and two weeks after her marriage, her left arm began to swell and be painful, and in the first part of June last, her left breast began to swell, and she soon began to feel darting pains in it at intervals of from one to five or six days, which still continue, and are gradually becoming more frequent and violent. In the first part of July last, her right ear began to swell, was very red, and soon became very painful, and the pain extended through the cavity of the ear into the right and middle portion of the head, and in three days the swelling of the ear subsided and left a tubercle of the size of a pea on the upper side of the jaw, near the ear; but the pain in the internal ear and head has continued with intervals of ease. On the 10th of November last, this tubercle began to enlarge, and to be irritated; and the external cervical and submaxillary tubercles of the same side began to increase in size, and to be painful, and soon after the throat, with the gum of the upper jaw of the right side became sore and painful, and in a few days after, the right side of the neck, with the lower and upper jaw, began to swell, and with the ear and right side of the head became very painful. Her heart began to beat very hard about the last of November, and this strong or hard beating continues. On the 26th of December she began to cough and expectorate, and this cough and expectoration continues.

Her stomach, from the commencement of the disease in the uterus, has been more or less disordered with the first mild and then acute symptoms of dyspepsia—bowels confined.

The marasmus has been slow but constant, and is now much advanced, with flaccidity of the muscles.

The disease, it will be seen by the history of this case, was traced with great accuracy to the different organs and limbs. It was then in an active state, in consequence of a cold; for when I repeated the examination, about two weeks from that time, after the cold had subsided, and the disease had consequently become passive, the pain produced by pressure did not dart into the diseased organs as before.

We can, therefore, not only determine the character of the disease by these symptoms, which are constant in all the cases, but we can determine whether it is in its active or passive state, in patients of all ages and conditions, without any previous knowledge of them.

When the disease commences in one organ or limb, it is frequently propagated to the other organs or limbs, as is seen in this and the following cases:—

Mrs. T. S., aged 31 years. She came to see me August 14, 1836, and says she has been out of health about five years. The examination in her case was commenced as usual, by an examination of the spine, and first, of the first cervical vertebra.

Pressure on a small tubercle of the right side of it produced severe pain, which darted into the right side of the throat, and right side of the head. Pressure on the right side of it produced pain, which darted into the left side of her throat. Pressure on the sides of the second joint also produced pain, which darted into the upper and front part of the neck. Pressure on the 2, 3, 4, and 5 dorsal, produced severe pain, which darted into the stomach. Pressure on the right side of the 7, 8 and 9 produced severe pain also, which darted into the region of the liver. Pressure on the 3 and 4 lumbar dorsal was painful. Pressure on the other cervical dorsal and lumbar vertebræ, produced no pain or effect whatever.

I now examined the line of glands along the neck, and under the jaws, and found them very much enlarged, and told her that her tonsils and palate were enlarged, and that she had dyspepsia, chronic inflammation of the liver and leucorrhœa, besides swellings of some of her limbs.

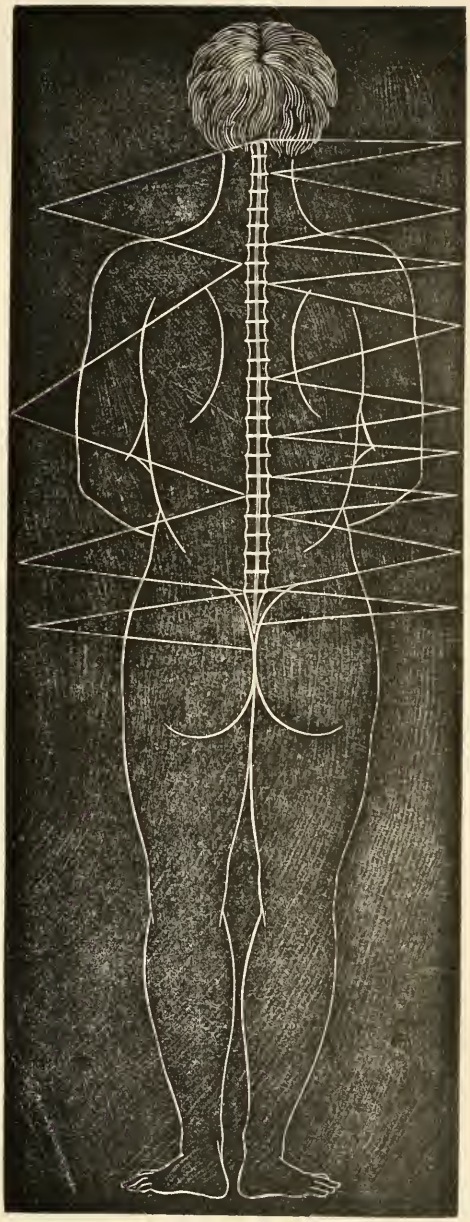
She said that was right, and that the disease commenced in the uterus five years before, and about a year after it commenced in her liver, and in a few months after that, in her stomach; and that it was now nearly three months since her ankles and legs began to swell. It is now a year since her catamenia disappeared, and they have not since returned. On examining her throat, found the tonsils and palate very much enlarged, and the tongue one-third larger than natural. The tonsils are very sensible to pressure, and have, with the palate and rest of the throat, a dark red color, and during the last few weeks the act of deglutition, or of swallowing solid food, has been difficult and painful. She has had more or less pain in the right side of her head with dizziness, during the last few months. She is also very pale, feeble, and emaciated.

Mr. W., merchant, aged 28 years, called upon me May —, 1836, who told me he had been out of health a number of years, and had been growing much worse during the last few weeks.

On applying pressure to the 2, 3, and 4 dorsal it produced a dull pain in these vertebræ. Pressure on the right side of the spine, between the 7 and 8 and 8 and 9 dorsal, produced the same kind of pain Pressure on the right side, between the 12th dorsal and first lumbar vertebra, produced severe pain, which darted into the region of the right kidney, showing the disease in an active state in the last organ, and in a passive state in the liver and stomach. There also appeared to be a swelling along the right side of the spine, extending from the 9th dorsal to the 5th lumbar vertebra, which had a puffy or elastic feel, and on comparing this with the left side of the spine, this swelling and puffiness was very conspicuous. Diagnosis. Tubercula of the liver, stomach, right kidney, and spine.

The disease, he informed me, commenced in the liver about three years before, and that it was about a year since it commenced in his stomach,

FIG. 29.



Cervical vertebræ.

Dorsal vertebræ.

Lumber vertebræ.

Os coccyx.

Press here to find symptoms of tubercula of the head, throat, and tongue.

Here to find them of the arms.

Here to find them of the lungs and heart.

Here to find them of the stomach and large intestines.

Here to find them of the liver.

Here to find them of the small intestines.

Here to find them of the kidneys.

Here to find them of the uterus.

And here to find them of the genital organs.

and three weeks since it extended to his kidney, and gave him the most serious alarm for his safety. He has, as usual in such cases, consulted and employed a number of physicians in this case, and rigidly followed their prescriptions, and yet the disease in the liver continued to grow worse—was extended to the stomach, and has now extended to the right kidney, and right side of the spine.

These forces point to the disease in every other part of the system that may be tuberculated, in the most arbitrary manner, as in these cases without any regard to the classification of nosologists, or the pedantic theories of the schools.

In *tubercula* of the stomach, and its immediate appendages, called dyspepsia, pressure between the 2d, 3d, and 4th, and sometimes 5th and 6th dorsal spaces, (counting from the last or large joint of the neck,) produces pain.

In *tubercula* of the liver, called *chronic inflammation* of the liver, or *liver complaint*, pain is produced by pressing on the right side, between the 7th and 8th, and 8th and 9th dorsal spaces, and directly opposite to the lower part of the right shoulder blade

In *tubercula* of the spleen, pain is produced by pressure on the left side of the last named, or 7th and 8th, and 8th and 9th dorsal spaces, and opposite to the lower part of the left shoulder blade.

In *tubercula* of the right kidney, pain is produced by pressure on the right side of the space between the 12th or last dorsal, and first lumbar vertebra, and in tubercula of the left kidney, pain is produced by pressure on the left side of the 12th dorsal and 1st lumbar.

In *tubercula* of the uterus, called leucorrhœa, chlorosis, amenorrhœa, and menorrhagia, pain is produced by pressure, between the 2d and 3d, and 3d and 4th, and sometimes 4th and 5th lumbar spaces, or between all the joints of the small of the back, expect the 1st and 2d.

In *tubercula* of the genital organs, pain is produced by pressure, between the 5th or last lumbar space, and the os-coxyx.

This pain, produced by pressure, is always more or less severe, in proportion to the severity of the disease. If there is but little disease, the pressure will produce but little pain; but if there is much disease, the pain will be severe.

The disease, in whatever organ it may be, is always either *active* or *passive*, and if it is *active*, when such pressure is made, *this pain, on every repetition of the pressure, will dart into the diseased organ, with a force or violence, proportioned to the intensity of the disease.*

These are the natural and scientific symptoms of the disease in its active and passive state in the organs—they are produced by natural causes, and are very plain, *invariable*, and easily understood.

When the disease has commenced in one organ or limb, it is frequently propagated from that to another organ or limb, as in the case of Mrs. J. P. —cases in which it is propagated from the tonsils and uvula to the lungs, and from the stomach to the lungs, and from the liver to the stomach, and from the uterus to the ankles, legs, and stomach, are very common.

In distinguishing the disease, and in tracing it in the different organs and limbs, I commenced and pursued the examinations as detailed in the cases appended to this work as I commonly do, without any previous knowledge of them. Any person of common education and capacity may easily distinguish the disease in the same way, in any of the organs or limbs.

In examining patients with chronic diseases, it should not be forgotten that the disease is sometimes in an active, but *most commonly* in a passive state. If the disease were constantly in an active state, patients would die with it in a few weeks, like those with acute diseases, instead of living as they do months, and sometimes years. We can always tell, in an instant, whether it is in an active or passive state, in the organs, by pressure in the proper places on the spine. If the disease is active, the pain produced by the pressure will dart into the diseased organ with a violence proportioned to the intensity of the disease, but if it is in a passive state, pressure produces pain in the spine only, which does not dart into the diseased organ as in its active state, but is more or less severe in proportion to the progress of the disease.

In many cases of the disease affecting the different organs, pain more or less severe is felt along the vertebræ, when none is felt in the diseased organ. We frequently find the same phenomenon in disease of the hip-joint, where the pain is in the knee instead of the hip.

Patients consequently refer the disease to the place where the pain is felt, and some physicians who have no more knowledge than they, agree with them, and apply their remedies to the same place. Large blisters have been applied to the knee, and cupping, blistering, setons, issues and the moxa to the spine in such cases without mercy during many months, and an enormous amount of suffering has been frequently endured in this way with little or no benefit to the patient.

Pain is also produced by pressure on the chronic enlargements or white swellings of the joints and limbs.

In these cases large tubercles, as well as smaller ones will be found on one or both sides of the neck or groin, and always on the same side with the disease.

When, in the last stage of this disease, motion ceases in these organs, or death ensues, we find, on examination, that they are all enlarged, thickened or swollen, and their specific gravity much increased. On a further examination we find the primary lymphatic glands attached to the organs with the subsidiary glands in their substance, as also, those of the series along the side of the spine, with their satellites (connected with the organs through the spinal nerves) tuberculated.

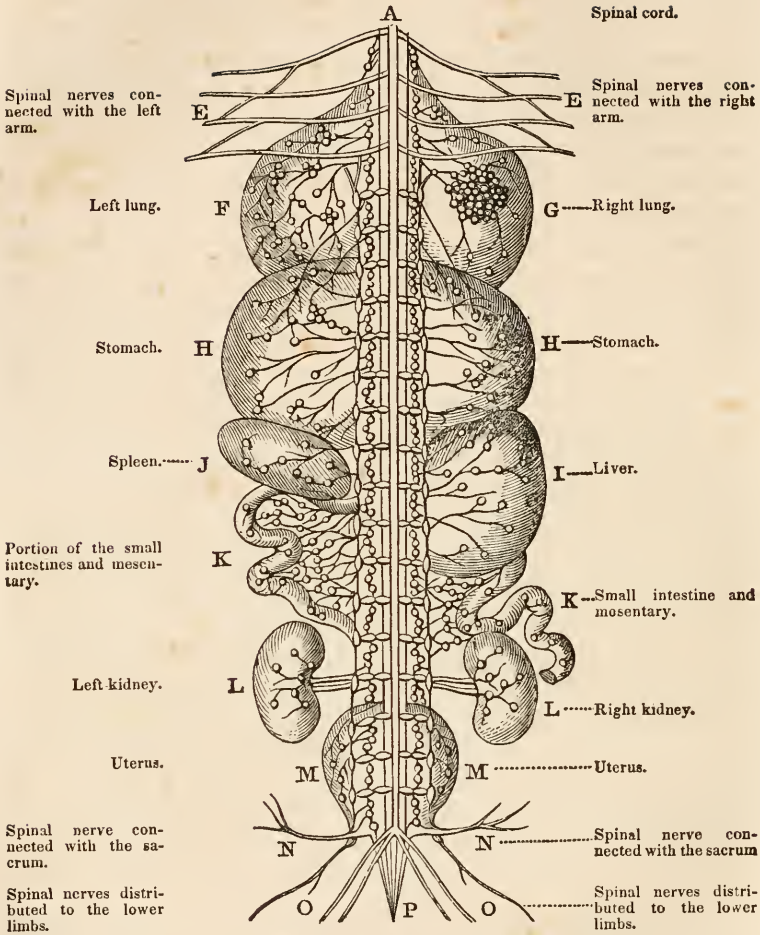
In tubercula of the lungs, or consumption, the tubercles are generally found occupying the upper portion of the lungs, and the left lung more frequently than the right. They are frequently formed in clusters, like clusters of grapes, as may be seen at F and G in Fig. 21, (representing a back view of the organs, spinal cord, and its connection with the spinal nerves, the great sympathetic nerves, with the ganglions or consecutive poles and series of lymphatic glands). At other times, the tubercles are seen either thinly scattered about in one, or in one and a part of another, or in both lungs; but at other times one or both lungs are nearly every where filled with them, and are in this organ generally of the size of peas, when they have arrived to their mature state. They then begin to soften in the middle, when the whole mass is gradually changed into a thin fluid, mixed with cheesy matter, which soon makes its way into the bronchial or air tubes, and excites cough and expectoration of tuberculous matter. Sometimes, however, although rarely, it makes its way into the cavity of the pleura, and produces pneumato-thorax.

In the cases where there are only a few tubercles in the lungs, and at a sufficient distance to prevent them from breaking into each other, and one or two soften down, and produce a small excavation, they do not necessarily endanger life; for in such cases patients may, and do live many years, although they may have two or three such excavations form every year.

In the cases where they are in clusters, and after one has softened down and produced a small excavation, others adjoining it soften down and break into it, and in a few days or weeks, produce in this way excavations proportioned to the size of the clusters; and these may be from half an inch to two inches in diameter; and when the whole of one or both lungs are nearly every where crowded with tubercles in a mature state, a large excavation is generally formed, which might contain an orange.

Hæmoptysis or hemorrhage from the lungs, frequently accompanies consumption; and when blood is raised in small quantities, not much exceeding a wine glass full, it is generally exuded from the mucous mem-

Fig. 21.




brane of the bronchia, in place of its ordinary excretions, and is commonly a slight affection requiring little or no attention; but when raised in larger quantities, it is almost always the consequence of the effusion of blood into the air cells; and is an affection which, from its exact resemblance to the effusion of blood in the brain, in apoplexy, is now called pulmonary apoplexy.

These glands, around which the blood has been effused, are larger than natural, and are in clusters, and occupy a circumscribed space, commonly from one to three inches in diameter, in the centre of which a clot of blood is sometimes found.

Young people who lead a sedentary life, and do not consequently give to all their muscles, or the connecting substance of the organs, that exercise which is necessary to health, are very subject to hemorrhage from the lungs. The muscles and connecting substance do not have their natural exercise, and consequently do not get their natural portion of nourishment from the secreting organs. They become soft and weak, while the secretions or nourishment which should have been absorbed by them accumulate in the secreting organs, and distend them. The blood accumulates in the vessels around them, and bursts from the feeble barriers or connecting substance and muscles with which they are surrounded. The blood consequently either gushes from the lungs, when the patients generally linger a few months, or the heart or some of its large vessels give way, and they instantly sink never to rise again.

Hemorrhage from the lungs may also be produced by an aneurism breaking into the bronchia, or by the rupture of a blood vessel in an excavation; but these cases are very rare, and are quickly followed by death.

Chronic Bronchitis should not be confounded, as it frequently is, with tubercular consumption. It can always be distinguished from the latter disease by the absence of the symptoms we have given to distinguish it. Pressure on the space between the 7th and last cervical vertebræ, and first dorsal, produces no pain or effect whatever in chronic bronchitis, or pulmonary catarrh, as it is sometimes called, and dissections show it to be a chronic disease of the mucous glands of the membrane that lines the inside of the bronchial or air tubes of the lungs, which have no connection with the nerves of sensation.

The mucous membranes, therefore, have really no sensibility; and all their apparent sensibility is the consequence of the presence of the papillary lymphatic glands which rise from the serous membranes, conspicuously through them in some places, for the purposes of sensation, as in the tongue, nose, and genital organs.

In tubercula of the heart, its power or force is increased in the first stage of the disease, in consequence of the thickening and hardening of its walls, which either terminates in an effusion from its serous surface, and consequent dropsy of the chest, or in the last stage begins to soften down, become weak, till at length the blood bursts through its feeble barriers into the pericardium. In tubercula of the stomach H.H., called dyspepsia, the tubercles are generally small, and are found thinly scattered about in its membranes and in clusters, as seen in the figure, producing a thickening of the organ in patches of a size and number according with the dimensions of the clusters.

In tubercula of the liver I. the tubercles are sometimes in clusters,

and at other times only a few are found in it, as is frequently seen in the tuberculated livers of cattle and hogs.

Adhesions of the tuberculated portions of this organ are sometimes formed with the intestines, stomach, or peritoneum, through which tuberculous matter from its abscesses is discharged into the intestines, stomach, or on to the surface of the body.

In tubercula of the spleen J. and the kidnies L.L., the tuberculations are similar to those observed in the liver, and need not be repeated.

In tubercula of the intestines K.K., the disease is always found most intense in the small intestines, in consequence of their intimate connection with the mesenteric glands, involved in the same disease with their satellites in the membranes of these intestines at the same time. The tubercles are found more or less thinly scattered about in them, and in clusters, producing a thickening of these intestines in patches like those of the stomach, and at last terminate in ulceration.

In tubercula of the uterus M.M., called in its different stages amenorrhœa, leucorrhœa, menorrhagia, and chlorosis, the tubercles are in different cases found in different parts of it, sometimes in its body, at other times in its neck, and frequently in both, producing a thickening of its body, neck, and membranes, with an enlargement of a part or of the whole organ.

A suppression of the catamenia, more or less complete, or a mucous discharge from its mucous membrane, a muco-serous discharge from both the mucous and serous membranes, with prolapsus uteri, ulceration or hemorrhage are the uniform consequences of these tuberculations, involving either the whole or different parts of the structure.

In tubercula of the muscles, called in its first stage chronic rheumatism, the tubercles are generally found near the extremities of the muscles, or near the joints, and in its last stage in the fascia or membranes enclosing the muscles.

The swellings that arise over these tubercles, from the accumulation of their secretions in the lymphatic vessels, are soft and puffy, without discolouration of the skin, and are hence called white swellings, when affecting the limbs or joints of the limbs. They are, however, sometimes called by other names, when the disease appears along the joints of the spinal column, as King's evil in the neck, curvature and distortion of the spine, spinal disease, spinal irritation, nervous disease, and nervous irritation of the spine, showing most conclusively an entire want of knowl edge of the true character of the disease.

These swellings terminate in ulceration or abscess, and generally discharge their tuberculous matter upon the surfaces of the joints or limbs. The bones, like every other part of the body, are formed with the round

elementary bodies, including the lymphatic and other glands, with their vessels and nerves, but have a solid instead of the soft and elastic connecting substance of the organs, membranes, muscles, and skin, for the purpose of covering and protecting some, and of supporting every part of the whole system. When the disease commences in them, it goes through its natural order as it does in the organs, membranes, muscles, and skin, of tuberculation, swelling, and ulceration or abscess. In its active state, in bones of very hard texture, the pain is sometimes very violent, and of the kind called spasmodic, in consequence of their slow and difficult expansion; but there is generally but little pain, with long intervals of ease; and when, in the course of the disease, the elementary organs of which the bones are formed, are destroyed by ulceration, the small excavations, once occupied by them, are very conspicuous, and the channels of their vessels and nerves easily traced.

### CAUSE OF THE TUBERCULATIONS.

The frequent changes in the atmosphere, from the positive to the negative state, and its modification at the same time by heat and cold, is a common cause of tubercula of the organs and limbs; because these changes and modifications of the atmosphere produce corresponding changes in the positive and negative states of our bodies, and modifications of the secretions and excretions.

When the organs or limbs are tuberculated from this or any other cause, they are more or less sensible to pressure, because it contracts them; but when the pressure is removed they expand, and the pain ceases. So when the atmosphere is damp and cold, it is in a negative state, and the attractions and contractions are prevailing over the repulsions and expansions, and contract the tuberculated organs or limbs, when such patients have more pain, and feel more dull and heavy than they do when the atmosphere is clear and dry, and in a positive state. For when the atmosphere changes from the positive to the negative state, the body changes at the same time from the positive to the negative state. When attractions and contractions commence in the tuberculated organs and limbs, and produce dull or aching pains, which torture such patients more or less, until the atmosphere changes from the negative to the positive state, when the pains cease, and they arise from their cots, throw open the doors, and walk abroad with buoyant spirits.

Tuberculated organs and limbs are also not only concomitant of, but frequently the consequence of intermittent, yellow, bilious, and typhus fevers, diarrhœas and dysenteries, &c.

"This influence of the meteorologico-medical constitution of the weather is appreciable even on external diseases, wounds, and operations. Dessault and Bichat paid much attention to this subject; and the rich collection of the memoirs of the old Academy of Surgery furnishes numerous examples of allusion to it."

But not only do the different seasons of the year exert a decided influence upon the general characters of prevailing diseases, but even the various periods of a single day appear to have a somewhat analogous effect. It was a favorite doctrine of Hippocrates, that there was a strict relation between the action of the diurnal revolution and that of the annual revolution of the sun on the production and the progress of diseases; *sicut in anno continentur periodi ægritudinum, eodem modo una die.* The morning was the analogue of the Spring, the noon was the analogue of Summer, the evening represented Autumn, and night corresponded with the Winter. The year was thus considered only a lengthened day, and each day a year excessively contracted. Many of our medical classics, who have belonged to the Hippocratic school of medicine, have confirmed and illustrated these views of the old Coan by numerous observations: we may mention the names of Sydenham, Triller, Baillou, Ramazzini, and Huxham, as among the most distinguished writers of this school. The most important of their conclusions are these:—

"Various diseases exhibit certain features of change during the day and during the night; patients, too, in their turn, have their feelings affected differently in a similar manner; and physicians have remarked that, even at different periods of a single diurnal epoch—that is to say in the time between the rising and setting of the sun—diseases often exhibit diverse phenomena."

Thus inflammatory diseases, those which are characterized by an exaltation of the vital forces, undergo usually towards morning their chief exacerbations: at the same period too their inversion most frequently takes place.

Catarrhal and mucous fevers, which are generally characterized by the slowness of their movements, and the atony which accompanies them, commence most frequently, and also become most exasperated, on the approach of night.

Bilious fevers, which seem to occupy a place between inflammatory and mucous diseases, have their paroxysms as well as their most frequent invasion about noon.

The period of the paroxysms approaches to either the morning or the evening, according as the prevailing diathesis is of a sthenic or of an asthenic character.

It is during the day, that by far the greatest number of accessions and paroxysms of intermittent fevers occur. On the other hand, the exacer-

bations of hectic fever usually occur in the evening and during the night; the sweats take place almost exclusively towards the morning.

Ramazzini, in his account of the epidemic constitution of 1690, describes an ataxic remittent fever, of which all the symptoms became greatly aggravated on the approach of sunset. The patients were alarmingly ill during the whole night; but from the first appearance of the sun, all the bad symptoms ceased, and the patients could rise and walk about, *velut angues ad solem, cutem curantes, erecti*—to use the expression of the writer.

Huxham, too, in his beautiful treatise on malignant angina, remarks that this disease, during its entire progress, presented exacerbations during the evening; and that, even when the patients were tranquil and comfortable during the day, the symptoms always became aggravated in the evening.

We may here, with advantage, allude to a curious approximation, that has recently occurred to our minds, between the facts now mentioned and the beautiful discovery of M. Daguerre.

According to the observations of this gentleman, the hours in the morning and in the evening, equidistant from noon, and corresponding, therefore, to the same amount of elevation of the sun above the horizon, are not, however, equally favorable for the production of photographic images. He has found that at all seasons of the year, in circumstances of the atmosphere apparently exactly similar, the image is formed a little more quickly at seven o'clock in the morning, for example, than at five o'clock in the afternoon, at eight p. m. than at four p. m., and at nine a. m. than at three p. m.

Now, if such be the case with the action of light on dead matter, there may be something analogous to it in its influence on living bodies both in disease and in health. The human frame, it is well known, is more sensitive than the most delicate instruments that can be made; why then may it not be acted upon in some peculiar way by the ever-varying conditions of the light and heat of the sun? It is, therefore, quite possible that the discovery of M. Daguerre may give rise to the discovery of many phenomena in physiological and medical science.

The great fact of the diurnal movements is seen not only in some acts of human life, but also in many phenomena observed among the lower animals. But the same law does not apply to all, or give rise to uniform results; for the influence of light and heat is often manifested in a manner that is different and even quite opposite, not only in individuals, but even in tribes both of the animal and of the vegetable kingdom. There are some nocturnal species of animals among mammals, birds, reptiles, and insects.

The same phenomenon of diurnal movements is observed in several functions of vegetable life. Every one has heard of the sleep of plants, Flora's clock, &c., &c. Draparnaud has observed that at the end of autumn, when the weather begins to become cool, the flowers of the ipomœa violacea, and of several species of mirabilis, which are usually night-blowing flowers, open at this period of the year during the day also.

Analogous diurnal movements have been observed in various phenomena of meteorology; as, for example, in the indications of the compass and the barometer. It is at the hottest hours of the day that hail is generated most abundantly, and in Europe it almost always falls during the day.

It is probably by following out such analogies as these, in bringing them together, and comparing them, that we may hope to discover the laws which these phenomena obey, and the general causes which give rise to them.—*Gaz. Medicale.*

Man, however, before he can succeed in the objects of such comparisons, must first learn the universal cause of motion, and the laws by which it is governed, through the whole range of the solar system, when he will learn it is to the laws of the magnetism of the human system, and of the medium which surrounds it, to which he must look to "discover the phenomena they obey;" for our mother earth is a magnetised body, and imparts its elements of sensation, inclination, and motion to man and the myriads of bodies belonging to the animal and vegetable kingdoms. It is magnetised geometrically, or in the most regular and perfect manner, as is shown by collating the numerous observations on the dip and variation,—has two magnetic poles, which mark the arctic and antarctic circles, determine those of the tropics, and the inclination of the earth's axis to the plane of the ecliptic.

These poles, with their meridians, revole from east to west, by the influence of the repulsive and expansive force of our magnetised sun, while the earth revolves on its axis, and in its orbit, from west to east, by the influence of his attractive and contractive force.

The annual rate of motion of these poles determines both the amount of the repulsive force, and the diameter of the sun as seen from the earth; while the amount of this force upon the earth, with the varying inclination of its axis, from the spiral motion of its magnetic poles, determines alike its form, and a long period of revolution in another orbit.

The earth moves in this orbit, as in the former, from west to east, and the ocean moves slowly over it, from east to west, at the same time, by the force of the spiral motions of these poles, draining the valleys and mountains on one side of our globe, and inundating in its course those on

the other.* In the mean time the magnetic poles traverse the northern and southern hemispheres, pass the equator with the axis in the plane of the ecliptic, and then mount to the opposite terrestrial poles, with the axis perpendicular to it.* They then descend with the axis, as before, pass the equator, and again mount to the terrestrial poles, in one entire revolution of the magnetic poles, the ocean, and of the earth in this orbit.

During this revolution of the ocean and the poles, two geological strata are formed over our globe,—in the valleys and upon the mountains,—and they are necessarily of two kinds, or a positive and a negative stratum,† which, with the remains of volcanic disruptions, answers in the most positive manner all the demands of geology; while the motion of the earth in this orbit disclose the cause of the astonishing changes which have taken place in the climate, and in the vegetable and animal kingdoms, over every part of our globe; for every part of the earth passes through the plane of the ecliptic, in every revolution, and feels, in its turn, every where alike the never fading influence of a tropical sun.

If man could, at any time, be satisfied with the knowledge he had attained, he might rest here from his labors, and contemplate in detail the effects of this influence over every part of the earth; but the mammoth, the mygalonix, and the long list of other ancient animals of a similar size, having disappeared from the earth, he can have no rest until he shall have ascended to the highest pinnacle of the temple of science, where he can see in the vast expanse before him the earth moving round the sun in this orbit; has marked the other changes, produced by the varying inclination of its axis to the plane of the ecliptic, and has learned the causes which have sustained these huge animals on the earth during one period of time, and overwhelmed them in another. Where he can view the

* The water is now falling in the European and rising in the North American continent. It is receding in the Baltic, by actual measurement, at the rate of about 5 feet in 100 years; and from numerous observations of different persons along the Atlantic coast of this continent, the water is supposed to be rising here at the rate of about 3 feet in 100 years.

* According to La Place, the angle of the earth's axis with the plane of the ecliptic, does not vary more than about 2° 40′. The calculations from which he obtained this result were, however, founded upon the hypothesis, that the increase and decrease of this angle is produced by the attractions of the planets or of Jupiter. He knew nothing of the spiral motions of the magnetic poles, their rate of motion, time of revolution round the earth from east to west, or of their great revolutions from pole to pole, and consequently knew nothing of the amount, or of the true cause of the variation of this angle.

† The magnetic character of the northern and southern hemispheres are changed every time the magnetic poles pass the equator. Two strata are therefore formed in every revolution; one of which is a positive and the other a negative stratum, or one stratum of one kind of rock, and the other of another kind, which corresponds with the order in which they are uniformly found in the earth.

earth revolving round the sun in a perfect circle,‡ with its axis perpendicular to the plane of the ecliptic,—the magnetic poles and magnetic meridians corresponding with the terrestrial poles and terrestrial meridians, and the sun shining in triumph from pole to pole in every part of its annual orbit. Where he can see the continents and islands covered every where with a luxuriant foliage, with majestic forests and elysian fields, during one period of time; and the poles at the equator, the axis in the plane of the ecliptic, and the earth moving round the sun in its extreme elliptical orbit, shorn of its vegetation, covered with snow, and presenting every where a cold and barren waste, saving a zone or belt, in the extreme oblique apparent course of the sun in another.

He can then see that the quantity of vegetation on the earth is very little, or minimum, when the earth's axis is in the plane of the ecliptic; and very abundant, or at its maximum, when it is perpendicular to it; and he can then comprehend the reasons why these animals were supported in abundance in one period, and became extinct in another.

He can also see from this eminence that the number, as well as the size, of animals on the earth, is minimum in the middle of the iron and forlorn age, when the axis is in the plane of the ecliptic, and maximum, in the middle of the golden and happy age, when it is perpendicular to it.

These great changes in the relative position of the earth's axis with the plane of the ecliptic, and the consequences resulting from them, were well known to the ancients, and were taught in their temples from time immemorial, and are beautifully described by ancient and modern poets.

"That forms are chang'd I grant, that nothing can
Continue in the figure it began:
The golden age to silver was debas'd:
To copper that, our metal came at last.
The face of places, and their forms, decay;
And that is solid earth that once was sea:
Seas, in their turn, retreating from the shore,
Make solid land what ocean was before;
And far from strands are shells of fishes found,
And rusty anchors fixed on mountain ground:
And what were fields before, now, wash'd and worn
By falling floods from high, to valleys turn,
And crumbling still, descends to level lands;
And lakes, and trembling bogs, are barren sands:
And the parch'd desert floats in streams unknown,
Wand'ring to drink of waters not her own;

‡ It is now ascertained, by accurate observations, that the earth is slowly approaching the sun. It is mainly the consequence of the periodical decreasing ellipticity of the earth's orbit, and not from a resisting medium, as commonly supposed; for the earth can approach the sun from no other cause, except that of its condensation by the action of the magnetic forces, which cannot be appreciable, except by observations, taken at very distant periods of time.

Here nature living fountains opes ; and there
Seals up the wombs where living fountains were ;
Or earthquakes stop their ancient course, and bring
Diverted streams to feed a distant spring."

*Dryden's Pythagorean Philosophy.**

Having thus seen and contemplated the various effects of the physical causes produced by the varying inclination of the earth's axis to the plane of the ecliptic ; and having assured himself that we are again advancing in another golden and happy age, and that the time will again come "when there shall be no more thence an infant of *days*, nor an old man that hath not filled his *days*," but "when a child shall die an hundred years old, and the age of a man shall" again "be as the age of a tree ;" he may then direct his view to the other revolving orbs in our system, where he can see the planets with the ever changing phases of their satellites in an immense plane, passing in review before him with great rapidity around the sun in their annual, and with a very slow motion, in their millionary orbits. Some with their axis in this plane, and the orbits of their satellites perpendicular to it, in the middle of their iron or forlorn age of general deluge ; and some with their axis perpendicular to this plane, and the orbits of their satellites parallel with it in the middle of their golden and happy age ; while the axis of others, with the orbits of their satellites, are seen to be variously inclined to this plane, presenting, with the changes of their tropical and polar circles, and with the variety of their plumage, the most enchanting scenery ever beheld by man.

The remains of the ancient temples of the Eastern nations, as the Phenicians, Persians, Assyrians, Egyptians, Chinese, and Hindoos, on which their astronomical observations were made, and which have withstood the assaults of time during an immense period, and of the barbarians during the last 2000 years, attest both the great importance these nations attached to the science of astronomy, and the untiring industry with which they pursued their studies in it. They were their observatories and their temples of science, in which the highest branches of astronomy were taught, as well as the elements of that science now taught among the Western nations.

The higher branches included a knowledge of the magnetism of the earth, of the motions of the magnetic poles around it, from east to west, the phenomena of the variation of the needle, the spiral motions of the

* Pythagoras spent 22 years in Egypt and India to complete his education ; and, on his return to his native country, taught the system of astronomy he learnt there, the elements of which were long after published by Copernicus, and are now called the Copernican system.

magnetic poles, the revolution of the ocean, and of the earth's axis in its millionary orbit, as well as the changes produced on the earth by the continued operation of these causes.

According to the received chronology of the Western nations, the oldest observatory was on the temple of Belus; and historians inform us that Berosus, the astronomer of Babylon, told Alexander, and the philosophers who accompanied him in his expedition, about 330 years B. C., that it was then 430,000 years since the earth's axis was in the plane of the ecliptic, and presented them with astronomical observations during that period.

This period, however, must have been longer, or, in other words, they could not have been mean years, for the motion of the earth on its axis varies in the different ages, and is minimum when the axis is in the plane of the ecliptic, and maximum when it is perpendicular to it; the mean annual rate acknowledged by the Eastern nations, and proved by the observations of Pytheas 330 years B. C., as compared with the observations at Paris in 1801, being 33‴ 45⁗, whereas the mean rate of the period given by Berosus, ascertained by dividing 66° 10′,* the angle of the axis at that time with the plane of the ecliptic by 430,000, is only 33‴ 15⁗ Besides the depression of the terrestrial meridians, or the depression of the terrestrial poles, varies also in the different ages, and is minimum or 0 when the axis is in the plane of the ecliptic, and maximum or 32′ 26″ when it is perpendicular to it, making a depression of 16′ 13″ at each pole, and a protrusion at the equator of 16′ 13.″† The magnetic poles then, in placing the axis in a perpendicular position, in regard to the plane of the ecliptic, traverse the earth from the equator 90°—16′ 13″. Now, 2,000 years at the mean rate, the number of years required to be added to the number given by Berosus, to complete the *maha yug*‡ of 432,000 years, is 18′ 36″ 40‴, and if we now subtract from this amount the 16′ 13″ it will leave 2′ 23″ 40‴, equal (at the mean rate) to 270 years from the fall of Babylon to the end of the *maha yug*, and the commencement of the *cali yug*§ of 144,000 years, making in the whole, at the completion of this last period, 576,000 years, or one-quarter of a revolution of the earth in this orbit.

There cannot, it is believed, be any mistake in these facts which can

* There should be added to this amount 2′ 03″ 18‴ 45⁗ for refraction, which would make the true angle of the axis at that time 66° 12′ 03″ 18‴ 45⁗.

† The amount of the depression at each pole, on the 15th September, 1837, as calculated by the action of the magnetic forces, was 11′ 59″ 22‴ 16⁗, and the protrusion at the equator 11′ 59″ 22‴ 16⁗, and there can be no doubt but these were the exact amounts of the depression at the poles, and of the protrusion at the equator, at that time.

‡ A term of three ages of 144,000 years each, used by the ancient astronomers.

§ Age of heat.

make any material variation in the results we have obtained, except, perhaps, in the exact amount of the number given by Berosus, which might have been a few years more or less, and omitted to be mentioned by the historian. It was probably about 60 years more; for the philosophers of Babylon, in common with those of other eastern countries, who had been admitted in the inner temple, and initiated into the Elysian mysteries, proclaimed every where, in language expressive of great joy, the commencement of a new and happy age, about 330 years after the taking of Babylon by Alexander.

It was, therefore, about 431,670 mean years from the time the axis was in the plane of the ecliptic to the fall of Babylon, and the number given by Berosus, the number of revolutions of the earth on its axis during that period.

The Egyptians claimed to have accurately observed 373 eclipses of the sun, and 832 of the moon, during a period of 48,853 years, or from Vulcan to Alexander. The Hindoos, who are now universally acknowledged to be the oldest astronomers, allege that one of their books was written near the middle of the last golden age, or at a period when the angle of the axis with the plane of the ecliptic was 89° 14′.* They also claim to have observed 1,577,917,828 days in a *maha-yug*, from sun rise to sun rise, which gives 365d. 15h. 31′ 31″ 24‴, for the mean length of a day during that period, which is now reduced to 365d. 6h. 9′ 11″ 30‴, making a decrease of 9h. 21′ 19″ 54‴ since the time of the mean, and a difference of about ·455 years in a period of about 433,841 years, or since the axis was in the plane of the ecliptic, and the deluge at its maximum.†

* The angle of the earth's axis with the plane of the ecliptic, may hereafter be obtained with accuracy, at any time, by adding to the angle, found at Paris in 1801, 33‴ 45⁗ for every year after that time, and the small amount of increase of this rate. The time of year in which the observation was made should also be known, when either the angle of the axis or the obliquity of the ecliptic may be determined, at any time, with perfect accury, to the end of this period, unless the observation at Paris should require a small correction for solar nutation, which is said to be too small to be detected by observation, but which is shown by the action of the magnetic forces of the sun on those of the earth, to amount to 2″ 39‴ 39⁗,—the diameter of the circle in which the terrestrial pole moves around the *mean pole* being 5″ 19‴ 18⁗.

Obliquity of the ecliptic, by observation at Paris in 1801, 23°, 27′ 58″.

Obliquity of the ecliptic, by calculation in 1841, 23°, 27′ 35″ 30‴.

The average increase of the mean rate amounts to only 1‴ 03⁗ in a thousand years.

† The water is equally diffused over the earth and covers the valleys when the deluge is at its maximum. When the angle of the axis with the plane of the ecliptic, begins to decrease, the ocean begins to recede from the equator, and spreads over the valleys.

The length of a day is now 11″ less than it was in the time of Hypparchus, 276 B. C.*

It would be easy to add to these evidences, which are regarded as conclusive, a long list of well established facts, which correspond with them, but it cannot be necessary to do so, for many of them will naturally recur to the mind of the intelligent reader.

Having now advanced in the golden age more than 1840† years, we find the average heat of the earth, and the average age of man increasing, and there can be no doubt but they will both go on increasing in a gradually increasing ratio to the middle of this age, or until the earth's axis is again perpendicular to the plane of the ecliptic.‡

We find, therefore, that besides the diurnal and annual changes in the temperature, and constitution of the atmosphere, man is subject to other great changes in the temperature and constitution of the atmosphere, which belong to long periods of time, and which not only produce great changes in the diseases to which he is subject, but great and remarkable changes in the moral and physical character of our race, and hence the necessity of corresponding changes in the treatment of diseases.

Having shown the magnetic symptoms to be constant and uniform in a large class of chronic diseases, and the remote and proximate causes which produce them, with the causes which change their character in different periods of time, we may now show that the age in which we live demands a radical change in the treatment of diseases, by demonstrating the fact that the cases of the large class of tubercular diseases of the organs and limbs, uniformly lost by the old empirical remedies, may now be as uniformly saved by a very different and scientific treatment, adapted to the scientific symptoms by which they are distinguished.

The change in the character of inflammatory diseases during the last 30 years is very great; for patients affected with diseases of this class, will not now usually bear with impunity, more than about one-half of the depletion, that was required and sustained at that period.

* The angle of the Moon's axis with the plane of its orbit is about 4°, and is increasing at the annual rate of 6‴ 36⁗ in an increasing ratio; and will become perpendicular to the plane of its orbit in 142,155 mean years, or at the same time the earth's axis becomes perpendicular to the plane of the ecliptic. The plane of the equator and the plane of the Moon's orbit will then correspond with the plane of the ecliptic.

† 1845.

‡ The amount of the average increase of the heat of the earth, is about one quarter more than that found by M. Arago.

The bills of mortality and the rates of life insurance show that the age of man is increasing. According to the ancients, the minimum age of man is only 70 years, and his mean age only about 300, while his maximum age is more than 900 years.

This amount of change in the character of diseases will appear very great, as it is, for the time; but it is not, however, greater than the other great changes in the intellectual and physical character of man during the same period, from the great and continued changes in the physical causes by which he is surrounded, and which must go on increasing with an increasing ratio to the end of this age, when they will arrive at their maximum.

The ocean is depressed at the poles at the rate of 50 yards for every 1000 years, and is protruded at the equator the same number of yards in the same time; it is also protruded in other latitudes severally as follows, in periods of 1000 and 100 years.

| Poles. | 1000 Years. | 100 Years. | Equator. | 1000 Years. | 100 Years. |
|---|---|---|---|---|---|
| o | Yds. | Yds. | o | Yds. | Yds. |
| Lat. 90 | 50 | 5 | Lat. 00 | 50 | 5 |
| $67\frac{1}{2}$ | 25 | $2\frac{1}{2}$ | $22\frac{1}{2}$ | 25 | $2\frac{1}{2}$ |
| $61\frac{1}{2}$ | 18 | $1\frac{4}{5}$ | $28\frac{1}{2}$ | 18 | $1\frac{4}{5}$ |
| 54 | 10 | 1 | 36 | 10 | 1 |
| $49\frac{1}{2}$ | 5 | $\frac{1}{2}$ | $40\frac{1}{2}$ | 5 | $\frac{1}{2}$ |
| $47\frac{3}{4}$ | $2\frac{1}{2}$ | $\frac{1}{4}$ | $42\frac{1}{4}$ | $2\frac{1}{2}$ | $\frac{1}{4}$ |
| 45 | 0 | 0 | 45 | 0 | 0 |

The depression of the ocean, it will be seen, is maximum at the poles and minimum in lat. 45°; while the protrusion of the ocean is maximum at the quator, and minimum in lat. 45°. The deluge is consequently maximum in the latitudes north of 45° in the northern, and in the latitudes south of 45° in the southern hemisphere, when the earth's axis is in the plane of the ecliptic; and it is also maximum in the middle latitudes, or those between 45° and the equator, when it is perpendicular to it. Man and other animals are consequently driven, in different ages, from the latitudes of the maximum floods between 50° and 90° to the latitudes or the minimum floods, between 40° and 50°, where the earth is constantly habitable, and where a greater quantity of animal matter must consequently accumulate than in any other part of the earth. This corresponds with the observations of M. Bailly, who found the greatest quantity of animal matter between 44° and 45°. The action of the magnetic forces upon the ocean must necessarily produce a current in it from the equator towards the poles at one period, and from the poles towards the equator at another. This fact is observed during the present period; and the currents are from the poles towards the equator.

The force of these currents is maximum at the poles and minimum in the low latitudes, where they are merged in the force of the currents from east to west, produced by the repulsive force of the sun. *Note* C.

## CHAPTER VI.

### REMEDIES FOR TUBERCULAR DISEASES.

Having learned the symptoms by which we can with ease and certainty distinguish tubercula of the organs or limbs, and having also found the remote and proximate cause of these symptoms, we have surmounted the greatest difficulties we had to encounter, to effect the great object we had in view—that of saving from a premature grave a great number, every year, of the fairest and most talented portion of our race.

The object is therefore worthy of our greatest ambition, and we should pursue it with an ardor corresponding to its great importance.

Before undertaking to remedy disease, &c., it will be necessary for us to find the proper materials by which we may repair injuries to the human system as a machinist does to repair the injuries to a machine; and for this purpose, it will not only be necessary to refer to the laws of motion, but to the phenomena attendant on tubercular swellings of the organs and limbs.

We have seen in the illustrations of the laws of motion by which the body is governed, that repulsions expand and attractions contract. If then an organ or limb is increasing in size, it follows that the repulsive

and expansive force within the organ is prevailing over its attractive and contractive force. It also necessarily follows, that to reduce these swellings, it is important that the attractive and contractive force prevail over the repulsive and expansive force.

Nature frequently cures cases of this disease by a change in the action of these forces in this order. Thousands of cases of tubercular disease of the stomach, intestines, and liver, under the names of fevers, diarrhœas, and dysenteries, produced in the hot months, when the repulsive and expansive force in the atmosphere is prevailing over its attractive and contractive force, are cured in the cool months, when the attractive and contractive force of the atmosphere is prevailing over the repulsive and expansive force. When the hot weather commences, then those diseases begin to appear; and when the change of season gives to cool weather the ascendant, they begin to disappear, as is well known to the most common observers.

If we can now find means to counteract the force by which the organs and limbs are thus expanded, we shall not only be able to assist nature in repairing the injuries sustained during the progress of these expansions in the hot months, but we shall be able to repair the injuries in the cases in which these natural influences have failed. On an examination of the natural constitution of matter, we find there are two great divisions in the earth, one of which has a contractive, and the other an expansive force; or the contractive force of one, and the expansive force of the other, have a great preponderance over their opposite forces. We allude to the acids and the alkalies. The immense quantity of muriatic acid, and of soda, required to form the muriate of soda or common salt in the ocean and in the land, shows that these two kinds of matter are very generally diffused, and were first condensed with the water from the gases which probably constituted our globe in its primeval state. And as the muriatic acid, or the chlorine gas concentrated in the muriate of soda, forms the basis of the other acids, or a large proportion of the acids of our earth, so it is probable soda or a gas concentrated in it, forms the base of the greatest number of alkaline bodies. However this may be, we know that chlorine combined with other negative matter, has a strong power of contraction; and soda united with other positive matter, a strong power of expansion. We have familiar examples of the first in the case of acids, and of the last in the case of soaps. If, therefore, we can convey to the tuberculated organs and limbs, constantly and steadily, a harmless negative matter, in quantities sufficient to make the attractions and contractions in the organs and limbs prevail over the repulsions and expansions, we ought to be able to cure these diseases in their first stages as uniformly as they are produced.

Physicians have long been in the habit of prescribing chlorine for their

patients, combined with negative matter—with mercury, under the names of chloride of mercury, commonly called muriate or oxy-muriate of mercury, and sub-chloride of mercury or calomel, and with iron, commonly called muriate of iron.

They have also been sometimes in the habit of prescribing it in combination with gold, under the names of chloride and per-chloride of gold, and these combinations have been taken into the stomach, mixed with the chyle, attracted to the heart, and then repelled from it, through the arteries, to every part of the body, or to every part of every organ, limb, or other structure.

These, with Iodine, to which I have already referred, are the remedies principally relied on by physicians to cure or palliate this class of diseases. They are, however, differently selected, and they are prescribed in doses differing according to the diversities of medical opinion. The difference in the intervals of time, also, in which these remedies are directed to be taken, is very great; and the result of such practice is that which might very naturally be expected—an almost constant failure in curing the disease, and consequently an entire want of confidence in their efficacy.

We have, on the contrary, very successfully, during a period of more than twenty-five years, prescribed chlorine, united with gold and other negative matter, (by processes which it would be both tedious and useless to describe here,) in the form of a pill, in the same quantity and in the same intervals of time, in all conditions of patients affected with chronic diseases of this class. Note A.

As the series of lymphatic glands or secreting organs along the spinal column, and their satellites around the vertebræ, with the spinal nerves are involved more or less in the disease of the organs with which they are connected,—I use, also, a plaster composed of bitumen and iron, placed on the spine, for the purpose of making the skin under it excrete a mucous or positive matter, instead of its natural aeriform or negative matter during the progress of the cure; and for the same reason, the plaster is also applied over the white swellings of any part of the body, joints or limbs. Large quantities of the magnetic forces are evolved in the process of the decomposition of these remedies in the organs, and on the surface of the skin, which increase the strength of the primary and consecutive poles situated within the organs—gradually reduce the tuberculated organs and limbs—remove the compression of the nerves and re-establish the natural action of the motive power of the system. Note B.

As a per-chloride of gold and soda is one of the principal articles that enter into the composition of the pills, we are pleased to be able to introduce here the following notice from a French periodical, of its effects

in the class of diseases in which we have so long used it, and to which our attention was directed by the kindness of a friend:

"M. Legrand, to whom the profession is already indebted for a valuable work on the employment of salts of gold in the treatment of syphilis, has recently proposed in a memoir read before the Academy, apparently with much reason, the use of the same mineral in the cure of scrofula, when it affects the soft parts of the human frame, as the skin, the adipose and cellular tissue, certain parts of the mucous membranes, and particularly the lymphatic glands, both external and internal, and, in short, any texture not osseous or immediately connected with the osseous texture.

"This agent, M. Legrand, exhibits, either externally by means of auriferous frictions, or by dressing the sores with pure gold in the form of an impalpable powder mixed with lard; or, internally, in the form of pills or pastilles, or rubbed on the mucous papillated surface of the tongue. In the first case, that of impalpable powder, one-sixtieth part, or about four or five grains of gold powder, are made into an ointment with half an ounce of lard. M. Legrand, however, thinks he has ascertained that it has not a medicinal action on the economy equal to that of the oxides or of the salts.

"The forms of the mineral most strongly recommended are, the oxide of gold by potass; the oxide of gold by tin, occasionally called the stannate of gold; and, lastly, the per-chloride of gold and soda, more generally known under the name of the muriate of gold and soda, in the order now specified, the most energetic being placed last. These last preparations are indeed so active, that they cannot be administered in doses above 1-15th, 1-12th, or 1-10th of a grain; and in large doses they would produce most serious disturbance in the economy.

"These preparations, however, unlike antimony, arsenic, or mercury, are void of corrosive properties, and seem chiefly to excite the animal tissues to more salutary action; and, according to M. Legrand, they are, when not sanative, not injurious. Hence their use may be much longer continued than those of the preparations of mercury or arsenic."

M. Legrand is mistaken in supposing that the per-chloride of gold has a curative effect in disease of "certain parts of the mucous membranes." It has no effect whatever on the mucous glands, and no apparent effect upon any part of these membranes, nor has my combination of it, except in cases where the disease of the membrane is dependent on tubercular disease of the serous membrane to which it is united, and which disappears with the disease of the latter. He is also mistaken in supposing it has no sanative effect in osseous textures. It must be admitted, however, that it has very little, when used alone, compared to its action in the combination in which I use it.

The energy and efficiency with which these medicines must act, on the principles of magnetism, may be inferred from the following extract from Farraday's Researches on the "Absolute quantity of magnetism in matter."

"If two wires, one of platina and one of zinc, each one-eighteenth of an inch in diameter, placed five-sixteenths of an inch apart, and immersed to the depth of five-eights of an inch in acid, consisting of one drop of oil of vitriol, and four ounces of distilled water, at a temperature of about 60 degrees Fahrenheit, and connected at the other extremities by a copper wire, eighteen feet long and one-eighteenth of an inch in thickness, yielded as much electricity (magnetism) in little more than three seconds of time, as a Leyden battery of fifteen equal jars of such a size that each contains one hundred and eighty-four square inches of glass, coated on both sides, independent of the bottoms, and charged by thirty turns of a very large and powerful plate electrical machine in full action. This quantity, though sufficient if passed at once through the head of a rat or cat, to have killed it as by a flash of lightning, was evolved by the mutual action of so small a portion of the zinc wire and water in contact with it, that the loss of weight sustained by either would be inappreciable by our most delicate instruments."

Mr. Farraday deduces from his experiments that the quantity of electricity belonging to a compound matter is identical with the quantity necessary to effect a separation into its elements. Hence may be inferred the enormous quantity of electricity contained in a single grain of water, from the quantity required for its decomposition. "It must be in quantity sufficient to sustain a platinum wire of an inch in thickness, red hot, in contact with the air, for three minutes and three-quarters." "I have endeavored," he says, "to make a comparison by the loss of weight of such a wire, in a given time, in such an acid, but the proportion is so high that I am almost afraid to mention it. It would appear that 800,000 such charges of the Leyden battery, as I have referred to, would be necessary to supply electricity sufficient to decompose a single grain of water; or, if I am right, to equal the quantity of electricity, which is naturally associated with the elements of that grain of water, endowing them with their natural chemical affinity."

The influence of magnetism on animals in augmenting the force of the contractions and expansions of the muscles, and in altering the morbid and establishing the natural secretion, has been proved by a great number of facts. The experiments of Dr. Philip are so well known to the medical and philosophical world, that it is almost an act of supererogation to repeat them; but as this little work is intended for all classes of readers, we deem it advisable to introduce an abstract of them Dr. Philip "found that the secretion of the gastric juice in the stomach, which had been suspended

by the division of the 8th pair of nerves, was restored on establishing the voltaic current of electricity through the divided portion of the nerves next to the stomach. The accuracy of the experiment on which this conclusion is founded, was for a long time disputed; but it has been lately satisfactorily established, by their careful repetition at the Royal Institution by Dr. Philip, in conjunction with Mr. Brodie. Dr. Philip appears also to have succeeded in showing, that when the lungs and muscles are deprived of their proportion of the nervous influence, so that their functions are impeded, and the breathing has become difficult and laborious, increased facility is obtained in carrying on these movements by the stimulus of the galvanic power.

"It appears, then, from these facts, that the galvanic energy is capable of supplying the place of the nervous influence; so that, by means of its assistance, the stomach, otherwise inactive, digests its food as usual, and the muscular apparatus of the lungs are roused from a state of comparative torpor to one of healthy action." Dr. Philip, indeed, contends "that the inferences deducible from these experiments establish the identity of galvanism, electricity, and nervous influence."

*Directions for using the remedies.*

One pill must be taken night and morning, during three weeks, after which one pill every night; except in cases of children under three years and over one year and a half, when half of a pill only must be given every night on going to bed, until the disease is cured, no matter what the state of the stomach or intestines. In cases of children under a year and a half old and over three months, a quarter of a pill may be taken at bedtime in any convenient medium.

For children, the pill may be dissolved in water at the rate of four tea spoonsful of water to one pill, if care is taken to shake the solution well before using it.

Privation in dieting is neither necessary nor proper during the use of these pills; but on the contrary the most nourishing food must be taken in all cases where the stomach will bear it, and it will always be borne after a few days use of the pills.

Patients must not only take the most nourishing food, but must take any kind the appetite craves; that is when they have eat all they can of one kind of food, they may take what they can of another, and then of another, &c.

As soon as the swellings begin to lessen in the organs or limbs, the latter are flaccid and weak, and want support; they must get it from food.

*Directions for using the Plaster in cases where the disease is affecting the organs, as in consumption, dyspepsia, &c.*

In tubercula, or what is called scrofula or chronic disease, affecting the head or face, the plaster must be applied to the middle and upper part of the back of the neck or upper cervical vertebræ—in consumption, and also in chronic disease or hypertrophy of the heart, it must be applied over the lower half of the neck and extend down between the shoulders over the first, second, and third joints of the neck, or dorsal vertebræ,—in dyspepsia it must be applied over the first, second, third, fourth, fifth and sixth joints of the back between the shoulders, or from the large and last joint of the neck to the seventh dorsal vertebræ—in chronic disease of the liver it must be applied over the seventh, eighth and ninth dorsal vertebræ—in chronic disease of the spleen it must be applied over the same vertebræ—in chronic disease of the intestines and mesentery or chronic diarrhœa, it must be applied over the eleventh and twelfth dorsal, and first and second lumbar vertebræ—in the uterus or chronic disease of this organ or leucorrhœa, chlorosis or menorrhagia, it must be applied over all the joints of the small of the back or lumbar vertebræ. In such cases, the leather or cloth for the plaster may be cut five inches wide, and spread *very* thin three inches wide, leaving a margin on the sides and ends of about an inch, and must be renewed by adding a little more of the plaster, as often as the plaster becomes loose and does not adhere. If the plaster is renewed very often, or oftener than once in two or three days, and spread thick, it will in some cases make the back very sore; and in such cases, it may be discontinued two or three days, or until the pimples it produces are healed, and then reapplied as before, and its use continued until the disease is cured.

As the disease very frequently affects more than one organ at the same time, as the stomach and liver, or the lungs, stomach and liver, the plaster should in such cases be placed over all the joints through which the spinal nerves are connected with the diseased organs.

In the cases in which the disease of the organs is not very severe, the pills alone will be sufficient to cure it without the aid of the plaster, and in the bad cases that would require two or three boxes of the pills, the plaster may generally be discontinued after the use of one or two boxes.

*Directions for using the Plaster in white swellings of the limbs, jaw and neck, and in ulcers and abscesses.*

The plaster must be spread *very* thin (it is no matter how thin) on India rubber cloth, which is much better than any other, or thick oiled silk, or the rough side of a piece of oil cloth, or on very thin and soft

leather, or on glazed cotton or linen cloth, and of a size sufficient to cover the tubercles, ulcers, abscesses, or white swellings, or painful part of the system, and applied to them and removed and renewed once in every day, either by adding a very little more of the plaster, and what will be barely sufficient to give it a new surface, or by spreading a new plaster.

If, on removing the plaster, much of it should adhere to the skin, it may be washed off with soap, and the plaster re-applied, and this course must be pursued until the tubercles, ulcers, and abscesses or white swellings are removed. Small vesicles appear under the plaster in a few days after it is applied filled with lymph, but they soon disappear, and others are formed and disappear, and require no attention whatever.

*Observations on the use of the remedies in different cases.*

When white swellings of the joints or limbs, over which these plasters are applied, are cured, they are always smaller than the corresponding well joints or limbs, unless from long continued disease the bones of a joint or limb have, before its application, become permanently enlarged.

There are ninety pills in a box, a number sufficient, with a box of plaster, to last a patient nine weeks, and to cure any of the recent cases of the disease in any of its forms. In cases, however, of long continuance, or in the last stage, it will sometimes, from obvious causes, which I have not room here to explain, require two or three boxes of each.

These remedies, which I have used in my practice for more than twenty-five years, and during the time I have been investigating the phenomena of tubercula, and about which there is no mistake, are very active, but never produce any injurious or disagreeable effect upon the stomach, or any other part of the system, or any other that is noticed by such patients, except a steady improvement in all the symptoms dependent on chronic tubercula.

Improvement in health commences immediately, or very soon after the commencement of the use of the remedies, and their action continues steadily and forcibly, and cannot be easily diverted from their purpose, and the cure progresses steadily, with a steady increase of strength and flesh, unless it be checked by colds which sometimes retard, but rarely, or never, prevent a cure.

These remedies cure all the different forms of tuberculæ in their first stages, and a great majority of those in the last stage of the disease, known by the symptoms we have described, but called by different names according to their situation or other circumstances attending them, viz., scrofulous sore eyes, and ulcers of the cornea—ulcers of the ears—

disease of the antrum and nose—tinea capitis or scald head—king's evil and goitre in the neck—mercurial disease or chronic enlargement of the tongue and tonsils—chronic enlargement of the breast, or mammæ, including cancer in its first stage—phthisis or consumption—hypertrophy of, or chronic enlargement of the heart—dyspepsia, or chronic disease of the stomach—chronic disease of the liver, or liver complaint—tabes mesenterica, or chronic diarrhœa—chronic disease of the uterus, or leucorrhœa, amenorrhœa, chlorosis, menorrhagia, and incipient cancer of the uterus—ulcerated legs, fever sores—disease of the spine, disease of the hip joint—white swellings of the joints or limbs—morbid alterations of structure in the synovial membranes—chronic rheumatism (tuberculated muscles) or cases where one of these forms of the disease is complicated with the same disease in another organ or limb.

In typhus fevers the secreting organs or lymphatic glands of the small intestines with those of the mesentary, as well as the series along the spine, are always tuberculated, and dissections in such cases always show those of the small intestines and mesentary in a state of ulceration. Dissections also show that other organs are tuberculated at the same time, as the brain and its membranes, stomach, liver, &c.; and pressure along the spinal colum shows that such patients have the symptoms of tuberculated organs. And these symptoms are, whenever they are present, the evident indications that the remedies are the true ones, no matter by what names systematic nosologists or other medical writers may have chosen to call the disease. In diseases which have been confounded by nosologists with tubercula, but which from the absence of these symptoms, as well as from the evidences of post mortem examinations, have manifestly no connexion with them, as in chronic bronchitis and other affections of the bronchial tubes, &c., these remedies are entirely useless.

The liver and spleen are frequently found to be enlarged during and after intermittent fevers; and we always find these symptoms in these fevers after the first or inflammatory stage is past, and we frequently find by these symptoms that the stomach or some other organ is tuberculated at the same time. We also find these symptoms in remittent or bilious fevers after the first or inflammatory stage; and when such patients do not begin to gain health and strength after that stage is past, it is almost always in consequence of the ulcerated state of the small intestines, (as is now well known to physicians) when these will be found to be the appropriate remedies. They have saved many such patients, as well as those with typhus fever, when in the last part of the last stage of the disease, after the common remedies had entirely failed.

Scarlet fever is acute tubercular disease of the serous surface of the muco-serous membrane of the throat, which is extended to other serous

surfaces, as those of the stomach, lungs, skin and other organs. It goes through its acute or inflammatory stage in four or five days, when it becomes chronic, and demands the use of these remedies to reduce the tuberculations, remove the great and extensive compressions of the nerves, and re-establish the natural action of the forces which produce motion in the system. When, therefore, such patients do not begin to recover soon after the acute stage is passed, no time should be lost in the application of these remedies.

The yearly number of cases in which we used these remedies was at first very few, but they gradually increased with the improvements in the remedies suggested by long experience, when in 1835, or from the 1st January, 1835, to December 31st of the same year, they amounted to 163. I took notes of these cases in which the disease, affecting the different organs and limbs, was in the proportion seen in the following schedule:—

| | |
|---|---|
| Neck | 18 |
| Neck and eyes | 2 |
| Neck, nose, and spine | 1 |
| Neck, tongue, tonsils, and right leg | 1 |
| Neck, jaw, tonsils, ear, cerebellum, breast, heart, stomach, uterus, one arm and both legs | 1 |
| Neck and lung | 2 |
| Neck and stomach | 1 |
| Neck and mesentery | 3 |
| Tongue, tonsils, and uvula | 1 |
| Tongue, tonsils, and right leg | 1 |
| Nose and face | 2 |
| Lungs, (first stage) | 21 |
| Lungs, last stage with tubercles in a mature state | 1 |
| Lungs, with excavations | 5 |
| Lungs and both legs, and one ankle, with excavation of both lungs | 1 |
| Heart | 3 |
| Heart and liver | 4 |
| Stomach | 19 |
| Liver | 5 |
| Stomach and lungs | 18 |
| Kidney (left) | 1 |
| Liver and kidney (right) | 1 |
| Liver and stomach | 4 |
| Liver with abscess | 3 |
| | 119 |

| | |
|---|---|
| Brought forward, | 119 |
| Mesentery | 1 |
| Uterus and legs | 3 |
| Uterus and lungs | 2 |
| Uterus and stomach | 6 |
| Joints and limbs | 31 |
| Unknown | 1 |
| Whole number of cases in 1835, | 163 |
| Of these cases the number cured is | 154 |
| Cases not cured, in consequence of not using the remedies a sufficient length of time | 3 |

Of the cases which have died, the first was that of Master N., of Columbus, aged 16 or 17 years, whom I never saw, and of whose case I know nothing, except that it was about ten years since it commenced.

The second case was that of Mrs. B., of M., in the last part of the last stage of tubercula of the mesentery, with a frightful marasmus.

The third case was that of Mrs. K., of M., with a cancer of the uterus in a state of ulceration, complicated with abscess of the liver, which was discharging matter through the right side in four places.

The fourth case was that of Mr. W. W., of M. Michigan, with tuberculated right leg, left hand, heart, and scalp over the right frontal, and right parietal bones. The leg and also the scalp ulcerated in two places. He died of compression of the brain, in consequence of the injudicious use of nitrate of silver, which had been frequently applied by the direction of his physicians, to the upper part of the parietal bone, and penetrated through it to the brain, as shown by dissection.

The fifth case was that of Mrs. S., of Cincinnati, with tuberculated left lung in a mature state; and sixth, the case of Mrs. C., of Cincinnati, with hypertrophy of the heart, and excavation of both lungs.

We have taken but a few notes of the numerous cases in which we have used these remedies since 1835; but from all we have learned of the result of them, we are induced to believe that the proportion between those that have been cured by these remedies, and those in which they have failed, does not vary much from that shown in the above year, or from those of former years.

We are familiar with the use of the stethescope, having used it in a great number of cases since 1824, and cannot be mistaken in regard to the excavations in the lungs mentioned in the above cases, which show results in the use of these remedies as a cure for tubercular disease entirely unknown to any other course of treatment. They also show the importance of commencing the use of these remedies in the early stage

of the disease in this organ, and the uncertainty of the results when in the last stage.

The cases of this disease affecting the neck, called king's evil, are all cured with these remedies, excepting only those which have terminated in cancer, and which are easily distinguished by physicians—first by the solidity of the tumor, with the close adherence and dark color of the skin, and lastly by its fungus ulcers with granulated surfaces and everted edges of the skin. The symptoms which I have so often mentioned, also enable us to distinguish tubercula from cancer of the mammæ or breast, in which these remedies, like every other, fail. All the other cases of tubercula, particularly white swellings of the body, joints, or limbs, yield readily under the use of these remedies, including those in a state of ulceration.

The cases of the disease in the stomach called dyspepsia, are generally cured with the greatest rapidity, probably in consequence of the great quantity of the magnetic forces evolved in the decomposition of the pills in that organ.

When the small intestines are tuberculated, the habit is costive in the first stage of the disease; but when in the last stage, the tubercles become ulcerated, the habit is changed, and diarrhœa commences. In either case these remedies uniformly (with very few exceptions) re-establish the natural habit in from three to fifteen days. There are a few cases of long standing that require a longer time to effect the same object, and there are cases in the last stage of consumption uncontrolled by these or any other remedies.

In the cases of costive habits, medicine should be taken once a day on commencing the use of these remedies, in quantities sufficient only to move the bowels every day, and the dose gradually lessened until it is no longer required.

In amenorrhœa, leucorrhœa, and menorrhagia, the uterus is always tuberculated, or more or less enlarged, and these enlargements of this organ are uniformly reduced by these remedies in the first stage of the disease, and a great proportion of those in the last stage, and the natural action of this organ is thereby re-established. These effects of the remedies are so constant and uniform, in such cases, as to require no aid from other remedies, excepting only such as are accompanied with displacement of the uterus, and called prolapsus-uteri.

When this organ is enlarged, its weight is increased, and the ligaments by which it is suspended dilate, and it descends more or less from its natural position, and in many cases so far as to require mechanical support during the progress of the cure.

When, therefore, there is so much displacement of this organ as to produce much inconvenience in walking, it should be supported in its

natural situation by some of the numerous contrivances invented for that purpose, until the tuberculations are reduced, and its ligaments contracted to sustain it again in its proper position.

In closing these observations it may be useful to observe, that when blood is drawn from the veins of patients affected with chronic diseases, it is always of a very dark color, which imparts a dark, sallow, or unnatural color to the skin, both of which are uniformly found to be changed after one or two weeks use of the magnetic pills, to the light, florid, or natural color, and is no doubt the consequence of a chemical and healthy change in the character of the fluid, produced by magnetising it with the forces evolved in the decomposition of the pills.

## CHAPTER VII.

### CASES OF TUBERCULA DISEASE OF THE ORGANS.

#### *Consumption.*

Mr. G. W. B., of the city of New York, of light complexion and thin habit, aged 29 years, commenced the use of these remedies for consumption in April, 1839, they being prescribed by another physician, from whom, as well as from Mr. G. W. B., I obtained the following concise history of the case:

The disease commenced in August, 1833, with hemorrhage from the lungs, which was succeeded by cough and moderate expectoration, which continued to August, 1834, when the hemorrhage from the lungs was repeated. The cough and expectoration continued; and in August, 1835, the hemorrhage was again repeated, and his strength much reduced. The quantity of blood raised each time being from half a pint to a pint. The cough and expectoration gradually increased after this last attack of

hemorrhage up to the time he commenced the use of the remedies, when he was pale, feeble, and much emaciated. His cough and expectoration then began to decrease; the color of his skin soon began to assume a more florid hue; his appetite increased, so that he soon gained strength and flesh; and when he had taken three boxes of the remedies, or in about six months, his health was fully re-established, and it continues very good to this time.

### TUBERCULA OF THE LEFT LUNG.

Mr. R. H., of the city of New York, aged 30 years, had been out of health five years when he called to see me in June, 1837. On an examination of his case in the usual manner, I found him affected with tubercular disease of the lungs, stomach, and liver. The disease commenced first in the liver, and in about a year after was propagated to the stomach, and from thence to the lungs. This was about four months before he called on me, when cough and expectoration had commenced, which still continued. He was pale, feeble, and emaciated. Prescribed magnetic remedies. His health soon began to improve, but progressed at first slowly; yet, when he had used four boxes of these remedies, his health was entirely restored. He has since enjoyed as good health as any man.

### TUBERCULA OF THE LUNGS.

#### *Rapid Consumption.*

Mrs. D. R., of the city of New York, of light complexion, aged 19 years, commenced coughing early in the fall of 1838, while in a state of gestation. This cough continued with little expectoration until after her confinement on the 23d of February, 1839, when they both began to increase, and in a few weeks the expectoration amounted to about a pint a day. Her feet and ankles began to swell, accompanied with other symptoms of approaching dissolution, when she commenced the use of the magnetic remedies under the advice of another physician, on the 4th of April following.

These remedies checked the further progress of the disease, and in 48 hours after she commenced the use of them, her symptoms were evidently better; her cough and expectoration gradually decreased; the swelling of her feet and ankles disappeared; her appetite and strength increased; and in about two months after she commenced the use of the remedies, and after she had used one box of them, she called with her husband at my office to inquire whether it would be necessary to use

them any longer. I advised her to use another box; she did so, and has since enjoyed uninterrupted good health.

New York, *June* 15, 1840

I recognise, in the above description, fully the case of my wife.

Silas Reynolds.

TUBERCULA OF THE RIGHT LUNG, HEART, STOMACH, LIVER, SPLEEN, KIDNEYS, SPINE, INTESTINES AND UTERUS.

Mrs. P., of the City of New York, of light complexion, and small and slender frame. I was called to see her on the 20th May, 1837, and on examining her spine, found she had tubercula of the right lung, heart, stomach, liver, spleen, kidneys, intestines and uterus. On inquiry I found that she was married at the age of 15 years, and had suffered two abortions. The disease commenced about two years before in the uterus, with leucorrhœa, and was thence first propagated to the stomach, and thence to the liver, spleen, heart, kidnies, and at last to the right lung. In January of the above year, cough and expectoration commenced, and had continued to that time. The whole length of the spine was very sensitive to the touch, and she could consequently bear but very little pressure upon it. On her observing that there was some swelling along her back, I examined it, and found a white swelling along each side of the spine, extending from the sixth dorsal to the third lumbar vertebræ. As this was an extraordinary case of tubercular disease, involving so many organs, as well as the vertebræ at the same time, I requested the liberty of inviting several distinguished physicians to see it before I commenced the use of the remedies. This request being granted, I invited four of them to see it; all of whom agreed, after an examination of the case, that it was hopeless of cure under the use of the common remedies. I then commenced the use of the magnetic remedies—the plaster to extend the whole length of the spine. Her health began to improve soon after. About the first of July, her cough and expectoration had increased during a few days, and on an examination of the chest with the stethescope, I found an excavation in the upper part of the right lung, showing that a cluster of tubercles had softened down and made their way into the air tubes, and left an excavation since I first examined her lungs.

Her health soon after began to improve again—the white swellings of the vertebræ disappeared; and in about seven weeks the excavation was healed and entirely closed, and her cough and expectoration also disappeared in a few months after. The other tuberculated organs were gradually reduced to the natural state; and soon after the state of gestation was renewed, and continued through the natural period.

TUBERCULA OF THE LUNGS.

*Rapid Consumption.*

Mrs. P. S., of S., Hamilton county, Ohio, aged twenty-eight years. I was called to see her, September 16th, 1833. She had hectic fever, with cough, expectoration, night sweats, and diarrhœa. On applying the stethescope to the chest, it gave the symptoms of tubercular engorgement of the left lung. These symptoms came on about three weeks before, and two weeks after her confinement with her last child. She had irregular pains in the left side of the chest for three months previous to her confinement, and was unable to sleep on her right side, as an attempt to do so increased the painful sensations in her left side. On examination, I found a number of tubercles on the left side of her neck, from the size of a pea to that of a large bean, and one on the side of the lower jaw of the same side, of the size of a small walnut. Two physicians had prescribed for her, but she continued to get worse, and her flesh and strength were wasting rapidly. Prescribed—magnetic pills and plaster. These alarming symptoms were checked in a few hours, her health soon began to improve, and in three weeks her cough, fever, night sweats, and diarrhœa had disappeared, and in another week her health was re-established. This was a case of rapid consumption, and she would not have survived under the common treatment more than *one or two weeks* longer.

TUBERCULA OF THE LUNGS.

*Consumption.*

Mrs. M. W——, of Union, Butler county, Ohio, aged 34 years. I was called to see her, August 22, 1834. She is above the middle stature, of dark complexion and slender form. Has enjoyed almost uninterrupted good health until about the first of June last, when she began to be feeble, and this feebleness continued, and in the last week in July began to cough, and in a few days after began to expectorate a thin and semi-transparent glutinous matter, and it was not until yesterday morning that the appearance of this matter changed to a yellow-white colour, and raised in a much larger quantity than usual, which now gave alarm for her safety and induced her to seek assistance. Her cough too had been attended with some degree of hoarseness after a few of the first days, and had increased so much that it was now with great difficulty that she could raise her voice above a whisper. Her flesh is wasting rapidly, and in the last few days has had a little fever, in the afternoon and evening, with a flush on her cheeks, and has begun to sweat in the after part of the night.

The catamenia has disappeared, and her eye has the clear and glassy appearance and expression which gives to her countenance that peculiar vivacity so characteristic of consumption She has a tubercle of the size of a pea on the upper and outer side of the left lower jaw, and another of twice the size on the lower part of the neck, and near the clavicle of the right side, and both are very sore or tender. Pressure on the lower cervical vertebræ produces pain, which darts thence into the chest, and pressure on the tubercle near the clavicle produces pain which darts under the clavicle.

Prescribed, pills and plaster. The plaster 12 inches long and five broad, to be applied over the last cervical and upper dorsal vetebræ. One pill to be taken night and morning for three weeks, and then one every night, with the constant use of flannel chemise and drawers, and to continue her usual exercise and exposure to the atmosphere.

Her cough and hoarseness soon began to subside, and in about four weeks they had very nearly ceased, and she had gained considerable strength, when she took a severe cold, which increased her cough and hoarseness, and lessened her strength, but they began to subside again in a few days and soon disappeared.

*October* 28*th.* Examined her chest again with the stethescope and found that the respiratory murmur, which at first was only heard very slightly in the lower part, and only in a few places in the upper part of the lungs, was now clear and distinct over their whole extent, but yet not so loud as in health.

*November* 14*th.* The tubercles which were at first nearly round and hard, have flattened down and nearly disappeared. The respiration is now loud and natural over the whole extent of both lungs. She has no cough, unless she gets a little cold, and then it is very slight, and no more than common, when enjoying good health, and has entirely lost the consumptive aspect of her countenance, and has nearly regained her usual flesh and strength.

*December* 15*th.* The catamenia has re-appeared after an absence of four months, and her health in all respects perfectly restored.

Her mother and two sisters have died with consumption.

*Oct.* 22, 1836. Her health continues good.

### TUBERCULA AND EXCAVATION OF BOTH LUNGS.

*Consumption.*

Mrs. J. C., of Union, Butler county, Ohio, aged 36 years. Called to see her, May 28th, 1835.

She has been very subject to cough ten or eleven years, and has had five or six slight attacks of hemoptysis during the last two years, and in

the last part of March last, her cough and expectoration, after two or three successive colds, was much increased, and has continued to increase to this time. She has irregular fever and night sweats, and has had diarrhœa, which gradually disappeared after her feet and legs began to swell. They are now swelled nearly to the knee, and are œdematous, and she is much emaciated.

Pressure on the right side of the last cervical vertebræ produces pain, which, on every repetition of the pressure, darts into the right lung, and pressure on the left side of the same vertebræ produces pain, which darts into the left lung.

On applying the stethescope to the chest, I found an excavation in the upper and front part of the left lung, and another near the middle of it, and a third in the front and upper part of the right lung. These excavations are not very large, and there are no tubercles in clusters in a mature state near them, or in any other part of the lungs.

*Diagnosis.* Tubercula and excavation of both lungs. Prescribed, magnetic pills and plaster. The action of these remedies commenced immediately, and in about four weeks her cough, fever, and expectoration had entirely disappeared, and the excavations were healed, and she had gained much flesh and strength. She has now, (July 4th,) no appearance of disease, excepting the swelling of her feet and legs, and this has almost all disappeared. *November 4th,* 1836. Her health continues good.

### TUBERCULA OF THE NECK AND LUNGS.

### *King's Evil terminating in Consumption.*

Mrs. L. B——, of Franklin, Warren county, Ohio, aged 35 years, came to me, August 16th 1832, with the form of scrofula called king's evil, which had been propagated to the lungs, and terminated in tubercular consumption.

The whole of the right side of her neck was covered with scars and ulcers, and they extended from thence down half the length of the shoulder blade, and half the length of the arm. There were sixteen ulcers discharging scrofulous matter, and a number of tubercles of different sizes, on her neck, arm and shoulder. She had hectic fever every day, with night sweats, and was coughing and raising large quantities of matter every day, and such as is raised in tubercular consumption. She was feeble and much emaciated. It was now more than six years since the disease commenced, and the tubercles began to suppurate; and more than five months since she began to cough and expectorate. On examining her chest with the stethescope, it gave the symptoms of tubercular engorgement of the right lung. Prescribed the magnetic pills and plaster. In seven weeks from this time, she came to me again,

apparently cured. The ulcers were all healed—only one small tubercle remained, and that much lessened in size. Her fever and night sweats had disappeared, and her cough and expectoration had almost entirely ceased, and she had gained so much flesh and strength as to make her appear as well as any other person. Her health has continued good Previous to her applying the magnetic remedies, physicians and doctors of all sorts had visited her; and her friends did not expect her to survive more than a few months.

### TUBERCULA OF THE RIGHT LUNG.

### *Consumption.*

Doctor B. S. Lawson, of Cincinnati, rather light complexion, tall and slender frame, aged 32 years. Called to see him about the last of October, 1836. His health, he informed me, had been gradually declining about eight years, and about the middle of August last, he began to cough and expectorate very freely. On examining his neck, found the submaxillary, and some of the cervical glands tuberculated; and on applying pressure on the last cervical vertebræ, it produced pain, but it was more severe when applied on the right side, between this vertebræ and the first dorsal, while pressure on the other vertebræ of the spine produced no pain or effect whatever.

I now applied the stethescope to the right side of the chest, and soon found in the middle portion of it, a space of about three inches in diameter, where the respiration was entirely inaudible, indicating from the absence of the crepitous and mucous rattle, a large and solid cluster of tubercles, rendering this part of the lung impermeable and immoveable. The respiration was natural all round this portion of the lung, and in every other part of the chest.

*Diagnosis.* Tubercula of the middle portion of the right lung. He now told me that a celebrated physician, who was attending him, had also examined him with the stethescope, and with the same result. He also told me that percussion had been frequently applied, which uniformly gave a dull sound over that part of the lung. He has the usual pale, lean, and haggard look, or consumptive aspect of the countenance; and the emaciation has made considerable progress; and he is gradually sinking. He has had prescribed for him, and has pursued the usual antiphlogistic treatment, including a large emetic tartar plaster over the front portion of his right lung, (from which he suffered severely,) with low vegetable and milk diet.

Prescribed, magnetic pills and plaster, with no restriction in diet. He commenced gaining strength in a few days after, and in about seven weeks, or at the time he had finished taking one box of the pills, I examined him again with the stethescope, when the respiration was as

audible, in the before-mentioned middle portion of the right lung, as in every other part of the chest, but presented now very clearly in this place, the sounds of bronchophony. His cough had now nearly abated, and he had gained in this time so much flesh, as to make him appear better than he does in his usual health; and has lost entirely the pale, haggard, and consumptive aspect of his countenance.

*January* 18, 1837. Examined his chest again. The sound of bronchophony in the circumscribed space in the middle portion of the right lung, and his cough and expectoration have ceased, and percussion gives now a full, clear sound.

He continues to gain flesh and strength, and his face, body, and limbs have now the full and rounded form of a person in full flesh, and the most perfect health.

It will be seen, that after distinguishing consumption by the new symptoms, the chest is, in most cases, explored with the stethescope. This is done to ascertain the order and state of the tuberculations; for, although they are detected in the first dawning of the disease—even in many cases before the cough commences—yet we cannot tell, without the aid of ausculation, whether these tubercles are scattered about at a distance from each other, or are adjoining each other in small or large clusters, like clusters of grapes, or have softened down and produced a small reparable or a large irreparable excavation. Hence the doubt that must exist in regard to the curability of the disease in its last stages in this organ, by the natural remedies, without the aid of ausculation, and hence its importance in this, as well as in many other diseases of the chest; yet very few know any thing of its advantages, in consequence of a deplorable defect in the education of physicians.

"It may be useful for me to add to the above history of my case, that besides the most perfect restoration of my health, (for such I believe to be my happy fortune, as far as I can judge,) that the above remedies have been a great benefit to me in another point of view. My physician, and other gentlemen of the profession, aware of the great danger hanging over me, advised me to change my location for a more southerly one, as affording the only hope, not of a restoration of my health, but of prolonging my feeble existence; and beyond all doubt it was the best prescription in their power to make. Now, I do candidly believe, that my case was incurable under the common mode of practice, and that the most judicious practice known to the profession was pursued by him to whom I submitted my case. According to the above advice, I determined to remove to the south, and had commenced preparation by selling off a part of my property, when I was, by the kindness of a friend, (a physician, too,) directed to Dr. Sherwood and his remedies—for which I consider myself under eternal obligation to the Merciful Disposer of all good.

"I do believe that every case of incipient tubercular consumption may be radically cured by a use of the above remedies; and I feel it my duty to submit my case, with these few remarks, to the public, from the fact that thousands are carried to an untimely

grave, in spite of the most scientific practice of the schools—that would, in my opinion, have been, with all certainty, saved by a use of the *electro magnetic remedies.*

B. S. LAWSON, M. D

From the Cincinnati Whig.

*Doctor Sherwood's Magnetic Remedies.*

The following correspondence has been handed to us for publication, in the belief that it will interest as well as benefit the community. Doctor Lawson, who testifies to the value and efficacy of Dr. Sherwood's remedies, is a regular graduate of the Ohio Medical College, and a physician of good standing. We have, ourself, made trial of the remedies, and think we derived essential benefit from them.

For the Daily Whig.

CINCINNATI, *January* 23, 1839.

Dr. LAWSON.—SIR: Having been informed that you have, during the last year past, prescribed in your practice Dr. Sherwood's Electro Magnetic Remedies in upwards of fifty cases, all of which were CHRONIC DISEASES, including scrofula, with great success, I take the liberty of making the inquiry of you, whether my informant was justified in making such a report from your own admission of the facts.

If you confirm this report, I should consider it a duty we owe to the cause of humanity to give it publicity as much as possible, and if false, we should disabuse the public mind of the imposition.

Dr. S. also challenges investigation as to the electro galvanic symptoms. Please inform me if you, in your practice, detect diseases by his method of examination.

Respectfully,

B. W.

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DEAR SIR: Your communication of the 23d instant was duly received, and an answer should more promptly have been given but for the want of a leisure hour, and a doubt resting on my mind in regard to the propriety of noticing anonymous letters.

Nothing, now, so much influences me to accede to your wish as a conviction of the importance of the facts which you wish to elicit from me, and thereby to diffuse them more generally through society.

I have a perfect detestation of every thing that has been presented to the world in the form of what has been generally denominated "quack medicines," and on this account I have always felt a delicacy in appending my name, or giving my influence to any thing which may justly be "dubbed" with such an appellation.

In the case of Sherwood's remedies, I am somewhat relieved from this difficulty, from two considerations: first, from the stubborn fact that, in my own person, I derived the most decided beneficial effects from their use, and at a time when all other means were pronounced as incompetent to a cure; and, in the second place, from being myself pretty well acquainted with the composition of the "remedies."

These two facts will serve as an apology for me, in candidly expressing my opinion with regard to the medicine. If I did not believe that thousands were suffering from diseases, incurable under any other system of practice, and certainly curable under this, I would not dare to offer one word in favor of Sherwood's remedies. From a conviction of this kind, I hesitate not, for one moment, to recommend them as infinitely superior, in chronic diseases, to any other course at present known to the medical profession.

I did use upwards of fifty boxes during the last year, and generally with success. I am, however, of the opinion, that in advanced stages of pulmonary consumption, they

are not so effectual as one would be led to suppose from reading Dr. Sherwood's pamphlet.

In almost every other form of scrofula, they have surpassed my most sanguine expectations. There are many citizens of Cincinnati who will certify to cures, in certain cases of long standing, which were not benefitted from any course which had been pursued, (and in these cases you know every thing is tried that is heard of,) and their certificates will be of sufficient variety, too, to prove all that is claimed for them, even by Dr. S. himself, with the single exception which I have made above.

I do not wish to be understood to convey the idea that they are infallible ; that is not my meaning, nor impression, concerning any thing on this earth ; but I do believe them to be as effectual in curing chronic diseases as ordinary remedies are in curing the ordinary diseases of our climate. I must be understood to have in view, in such a declaration as this, the exception which was made, and again referred to.

With regard to the symptoms, I believe that they cannot be gainsayed. I can detect, with the greatest certainty, the diseases called by Dr. Sherwood scrofula, without any previous knowledge of the patient, or of the history of his disease ; and this I do merely by an examination of the cervical glands and spinal column.

The ordinary course of feeling the pulse, looking at the tongue, and asking a hundred questions, more or less, is both useless, and a waste of time. I do not think that one skilled in this mode of examination can be deceived once in a hundred cases. In my practice, I pursue this mode of examination exclusively, with a great saving of time, and a much more satisfactory result. This is as much as I deem it now necessary to communicate.

Yours, &c.

To B. W B. S. LAWSON

I had no knowledge of the above communication of Dr. Lawson, until two or three months after its publication ; and as there are now many physicians, both in this city and in the different States of the Union, who are practising the new symptoms and prescribing the magnetic remedies, I have introduced it here to show the opinion entertained of them by other physicians, who have tested the certainty of the one, and the efficacy of the other.

In the advanced stages of consumption mentioned, we have constantly stated the uncertainty of the results, and urged the necessity of commencing their use in the first stage of the disease, when cases like that of Dr. Lawson are uniformly cured by them; and as the disease can now be easily distinguished, in the first stage as well as the last, there is now no longer any excuse for delaying their use until the patient is in the last stage, when the result must necessarily be uncertain.

In regard to the Doctor's allusion to secresy I would remark, that in the course I have pursued to defray the expense of the investigation and cure of this class of diseases, through a long series of years, physicians have no just cause of complaint: for I tell them what the remedies are; explain the principles of their action, and give them the evidence of their efficacy.

There is, however, a cause constantly operating to prevent many phy-

sicians from prescribing them in their practice, and that is a self-interest, which, with them, is paramount to every other; for they constantly prefer making up a bill against a patient of from fifty to five hundred dollars, with the old empirical and useless remedies, to a fee of as many cents for a bare prescription; and the tenacity with which they hang on to the *valuable* cases is truly astonishing to the uninitiated, as they uniformly prefer to see them sink into their graves, than saved from it by another physician.

### TUBERCULA OF THE STOMACH AND LIVER.

*Dyspepsia and chronic disease of the liver.*

Mr. J. B., of the city of New York, aged 28 years, called to consult me in August, 1837. He had dyspepsia and chronic disease of the liver, with which he had been affected about two years and a half. He had a sallow countenance, and was much emaciated.

Prescribed magnetic remedies. His health speedily began to improve, the sallowness of his countenance disappeared; and in about four months his health was fully restored, aud has continued good to this time.

### TUBERCULA OF THE STOMACH, HEART, AND EYES.

*Dyspepsia, enlargement of the heart, and scrofulous sore eyes.*

Mr. H. B. C., of the city of New York, aged 25 years, called to consult me in May, 1837. He had been out of health about ten years, was much emaciated, and was suffering severely with dyspepsia, hypertrophy of the heart, and scrofulous sore eyes.

The disease of the stomach commenced, in 1828, with the usual symptoms of dyspepsia, which had continued with varying severity. In 1831, he began to feel a hard beating of the heart, and, in 1834, the disease commenced in both eyes. He had consulted and been under the care of a number of distinguished physicians, without having received any material benefit. Prescribed magnetic remedies. His health commenced improving immediately, and in about six months was entirely restored, and continues good to this time.

New York, June 12, 1840.

I have read the above concise history of my case, and am pleased to have an opportunity to add my testimony to the value of the above-mentioned remedies, for I had given up all hopes of being cured long before I was induced to try them.

H. B. Cowles, 198 *Broadway.*

TUBERCULA OF THE EYES.

*Scrofulous sore eyes.*

Miss M. Wilkinson, of Syracuse, N. Y., aged 3 years. She had scrofulous sore eyes, with ulcers of the cornea. The disease commenced in 1836, when she was about a year and a half old. It gradually grew worse, and she became blind in about eight months from the time it commenced, and continued so until the spring of 1838, when she commenced the use of the magnetic remedies. In two weeks after she began to see, and in three weeks could see very well, when the shade she had worn a year and a half was removed from her eyes. I saw her in July of the same year, when her eyes were entirely well, and she enjoying fine health.

Her father is wealthy, well educated, and intelligent, and obtained the attendance and advice of the best physicians in the case; but the disease continued to make progress until it was arrested by these remedies.

TUBERCULA OF THE ANTRUM, NOSE, STOMACH, UTERUS, AND CEREBRUM

*Disease of the antrum, nose, dyspepsia, and leucorhœa.*

Mrs. J. C——, of S——, Hamilton county, Ohio, light complexion, middling stature and habit, aged 34 years. Called to see her, March 6th, 1833. She has severe pain in the cavity under the cheek bone, from which tuberculous matter issues into the left nostril, and the septum (division) of the nose is perforated at a point opposite to the place where the matter issues, and is also with the nose painful, and a little tumefied. The disease commenced with pain in the antrum, more than two years since, and after it had continued a few weeks, began to discharge a thin and sometimes bloody matter, which gave her much relief for a few weeks, when the discharge ceased, and the pain returned with its accustomed violence, and has pursued the same course to this time.

The pain, after the discharge ceases, is spasmodic, and a few months since extended to the left and front portion of the brain, and about two weeks since commenced in the scalp.

Having no time to spare for further inquiry, I commenced the examination of the spine; and first, with the first cervical vertebræ, and pressed hard with the fingers on a number of small tubercles on the left side, which produced severe pain, and which darted with such violence into the head, scalp, and antrum, as to prevent her from allowing me on any account to repeat the pressure; and I passed to the dorsal vertebræ, pressure on the third and fourth produced pain, which darted into the

stomach; and pressure on the second, third, and fourth lumbar vertebræ, produced pain, which darted into the uterus.

I now described to her symptoms of dyspepsia and leucorrhœa, which had been affecting her more than a year. Note D.

The pain in her head is confined entirely to the front and left portion, and never passes the longitudinal sinus. A number of physicians and steam doctors have attended and prescribed for her, during a period of more than two years, but the disease continued to get worse.

*Diagnosis.* Tubercula of the left antrum, nose, left and front portion of cerebrum, left side of the scalp, and of the stomach and uterus.

Prescribed magnetic pills and plaster. Her health soon began to improve; and in seven weeks the antrum and nose were healed, and her health in all respects restored, and she had gained nearly her usual flesh and strength.

### TUBERCULA OF STOMACH AND UTERUS.

*Dyspepsia and Leucorrhœa.*

Miss M. D——, of dark complexion, and naturally full habit, called on me May 28, 1833, with the usual symptoms of dyspepsia and leucorrhœa. The disease commenced about a year ago with leucorrhœa, and it soon extended to the stomach; she has no vomitings, but distress, and sometimes pain in the stomach, and at others in the right or left side of the lower part of the chest, or between the shoulders, with palpitations, and accompanied more or less with pain or weakness in the small of the back. She says she has lost considerable flesh, and is feeble and unable to labor, as an attempt to do so, or to walk up a hill, or up stairs, produces or increases the palpitations, when she feels faint, and is soon out of breath.

Pressure on the 2d, 3d, and 4th dorsal vertebræ, produces pain, which darts into the stomach; and pressure on the 3d, 4th, and 5th lumbar vertebræ, produces pain, which darts violently into the region of the uterus.

*Diagnosis.* Tubercula of the stomach and uterus. Prescribed magnetic pills and plaster. Her health soon began to improve, and in six weeks was fully restored.

### TUBERCULA OF THE INTESTINES AND MESENTERY.

*Tabes Mesenterica and Diarrhœa.*

Master M. G. M., of Cincinnati, aged three years. I called to see him, August 25th, 1834. He has an enlargement of the abdomen and diarrhœa.

The disease commenced when he was three or four weeks old, and has continued to this time. His limbs are very slender, and his muscles soft and flaccid, and his joints appear very large proportioned to the size of his limbs. He has five or six tubercles on each side of his neck, some of them very large. Two or three physicians have attended and prescribed for him at different times without any apparent benefit.

*Diagnosis.* Chronic tubercula of the intestines and mesentery. Prescribed magnetic pills and plaster.

The diarrhœa disappeared in a few days, and the enlargement of the abdomen, with the tubercles, began gradually to subside, and in seven or eight weeks they disappeared, and he had gained considerable flesh and strength, and had no appearance of disease, and his health continues good.

### TUBERCULA OF THE LIVER AND STOMACH.

Mr. W. H., merchant, of Louisville, Ky., aged 29 years, came up to me, April—, 1836, and informed me that he had been out of health a number of years; when I told him, as I generally do patients with chronic diseases, that it was all I wanted to hear about his case, as I would try to ascertain myself what his disease was, and where it was affecting him. He was pale, and on his removing his coat and vest, saw he was much emaciated. Pressure along the cervical vertebræ did not hurt him, but moderate pressure on the 2d dorsal produced severe pain, which darted into the stomach with such violence, as to produce excessive faintness for nearly half an hour. Pressure on the right side of the 7th and 8th, and 8th and 9th dorsal, produced severe pain, which darted into the liver. Pressure on the other vertebræ, below these, produced no pain or effect whatever.

*Diagnosis.* Tubercula of the liver and stomach. The disease, Mr. H. now informed me, commenced in the liver about five years ago, and about three years since extended to the stomach. He has consulted a number of physicians, east and west of the mountains, and has taken a great variety of remedies recommended by them, besides a great variety of nostrums, including Swaim's Panacea, but has been gradually growing worse, and so much so, that during the last year, he has not been able to take any food upon his stomach, excepting dry toast, without butter, and cocoa.

Prescribed, magnetic pills and plaster, and told him, as I commonly do, that he *must* commence getting well immediately, and that in about three days his stomach would bear, and that he must commence eating any kind of food that his appetite craved, and that in one week he might eat as much as it craved; and that in ten or twelve weeks, his health,

flesh, and strength would be re-established. I did not see Mr. H. again until November 6th, when I found him enjoying fine health.

### TUBERCULA OF THE LIVER AND EYES.

Mr. J. H. Esq., of L., Ohio, aged 34 years, called for advice, May 12, 1835. On examining the spine, I commenced between the first joint of the neck and scull, and pressed in the spaces between the joints below, one after another, and it produced no pain until I had descended to the space on the right side, between the 7th and 8th dorsal, when pressure between these, and between the 8th and 9th produced pain, which on every repetition of the pressure, darted into the liver. Pressure along the joints below these, produced no pain or effect whatever. On inquiring into the history of this case, I found the disease commenced in the liver, about six years ago, and has terminated in abscess, and broke and discharged through the intestines, four different times during this period. He is now feeble, and just recovering from the formation and discharge of the last one, which had reduced him nearly to death, and from which he and his physicians had but little hope of his recovery.

Mr. H. brought with him his son, aged three years, with hereditary scrofulous sore eyes. The eye-lids of both eyes are very much swollen and inflamed, and the inflammation extended over both eye-balls which had two ulcers of the cornea. The light was so painful to the eyes, as to render it necessary for him to hold a handkerchief almost constantly over them. The ganglia, or line of glands on both sides of his neck, with the submaxillary under the jaws, were very much enlarged and painful under pressure. The disease commenced more than two years since, and he has, since that time, been subjected to thorough courses of treatment, with the most popular remedies, without any apparent benefit

The magnetic remedies were prescribed, and were effectual remedies in both of these cases.

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The following correspondence on the subject of the efficacy of my remedies in chronic diseases, (of which I had no knowledge at the time it took place) has been handed to me for publication.

LOUISVILLE, *July* 12, 1838.

Mr. W. Foulke,

SIR: Your favor of the 25th ult. was received and handed to Mr. Wm. Hanna, of this city, who said he would most cheerfully make a statement of the effect of Dr. Sherwood's medicine in his case, if by doing so he could relieve one person from a disease under which he had suffered so much. His statement is on the preceding page, and is but one out of many cases that have come under my observation, with a similar result.

Very respectfully,

DAVID HOBBS.

Louisville, *July*, 1838.

Mr. W. Foulke,

Dear Sir: Mr. Hobbs having placed in my hand a letter from you, asking the opinion of persons in this city who have used Dr. Sherwood's pills and plaster, as also a statement of their individual case, I, as one of them, beg leave to state that about seven years since I was afflicted with what was called dyspepsia—my affliction consisted in almost constant pain in the bowels, stomach, side, back and head, the former so much so, that after eating, it was excruciating. For the first three years, I was under the treatment of the most eminent physicians in Baltimore, Philadelphia, and this city, without the least relief, and by all of them pronounced incurable. I then resorted to all the nostrums to be had, but with similar result.

On my return from the east, in the Spring of 1836, I was induced by my friend Mr. Hobbs, (who offered to accompany me) to visit Dr. Sherwood, at Hamilton, Ohio, who, on our arrival, proceeded to examine me, (according to the manner directed in several pamphlets since published) but my case was so bad, that he considered the operation might prove fatal if he continued; and consequently he felt doubtful of effecting the cure of so bad a subject. I, however, determined whilst there was a hope, to continue every medicine that offered, and at once commenced with the pills and plaster, which, after the third day, gave me great relief; and before I had finished two boxes became as well, and have continued so as I ever was during my life. I had lived for two years entirely on bread and tea. I was the first in this city that ever took the pills; but from the knowledge of my situation and cure, hundreds of others have since been relieved. For a more particular statement of my case I refer you to Dr. Sherwood's pamphlet, page —.

Respectfully, dear sir, your obedient servant,

WILLIAM HANNA

Cincinnati, *July 9th*, 1838.

Mr. W. Foulke,

Dear Sir: Your letter of the 25th June reached me in due course of mail, and in answer I can only say in regard to Sherwood's electro-magnetic remedies, or pills and plaster, that my youngest daughter was severely afflicted with scrofula, and for several months I availed myself of the best medical skill our city afforded, and all without success. Indeed, the disease continued to increase, and the eruption extended from her body into her face, nose, ears, and eyes, until we were obliged to keep her confined to a dark room, and almost despaired of her restoration. In this situation I was induced to make the experiment, and try the pills and plaster, the result of which was, in a few weeks, my child began to improve, and continued to improve until she was entirely restored, leaving nothing but some of the scars caused by the disease. She is now in fine health, and no indication of scrofula, and I have no doubt it is an effectual remedy for that distressing disease.

In regard to the application of it to myself I cannot speak in so strong terms. For several months I have had a severe cough, and my lungs considerably affected. I tried this medicine only so far as to take one box of the pills. I also travelled into the country, and my health is much improved, but the travel, exercise, and change of air was, doubtless, of great service to me; and in my own case, I know not how far I ought to attribute efficacy to the medicine. I shall be in your city some weeks—expect to reach there about 25th inst.—and if you should wish to see me, by calling on Mr. G. W. Richards, merchant, on Front street, he can inform you where I will be found.

Respectfully, yours,

WILLIAM McLEAN

CINCINNATI, *July* 2, 1838.

Mr. W. Foulke,

DEAR SIR: Your favor of the 25th is at hand. Agreeable to your request, I give a short history of my wife's case, and the result.

She had been afflicted for 8 years, and had become a confirmed dyspeptic—so much so, that she had not eaten a meal of victuals for 2 years, of any kind, without distressing her, and was seldom able to go out much. At this stage of the disease, and after exhausting all resources of medical skill, (I had concluded that travelling for her health was the only chance for her recovery). She earnestly solicited me to procure her a box of Sherwood's pills and plaster. I endeavored to persuade her, that they were like all other similar medicines, having no faith in them myself. But still she could not be persuaded to abandon the idea of trying them, as she had heard of several of her friends who had received benefit from them. After some month's delay, I purchased a box of them merely to gratify her. But, contrary to my expectations, she soon began to improve, and in 6 or 8 weeks could partake of any kind of food with the rest of the family, and from that time to this (18 months) has been free from any appearance of a return of the disease. She has used about two boxes.

Yours, Respectfully,
E. WHIPPLE

CINCINNATI, *July* 3, 1838.

Mr. W. Foulke,

DEAR SIR: In a line received this day, you request me to give you the history of my wife's case, in connexion with the application and effect of Sherwood's electro-magnetic remedies. I take pleasure in answering your inquiries, so far as my limited knowledge of the progress of disease and the effect of medicine will permit.

My wife is 19 years of age, of a very frail and delicate constitution. Prior to, or about the first of January last, she had enjoyed good health. About that time (perhaps a little before) she commenced declining, indigestion, and want of appetite, together with extreme weakness, indicated the approach of more serious disease. A few weeks passed, and she commenced coughing—her cough was of a dry, husky character, at first unaccompanied with expectoration. I was under serious apprehension that the consumption which had cut down, prematurely, her father and mother, and many other members of the family, had marked her for its victim, and commenced its work. At first, I resorted to some of the celebrated remedies for diseases of this kind (among which were the "Watasia," and the "Vegetable Pulmonary Balsam)," but all to no purpose.

Her cough increased daily, attended with profuse expectoration, and she was rapidly wasting away.

About six weeks after her cough commenced, I was induced to try Sherwood's remedies, confident that the ordinary practice of the physicians would only facilitate her departure, at the same time, doubting the efficacy of these remedies.

The day after she had taken the first pill, she had an unusual appetite for food, and I thought her cough during the night had not been so constant or severe. In three or four days, her cough and expectoration ceased, (the blue pill was abandoned) the tone of her stomach was restored, her strength increased, and she could partake of the strongest diet, without injury or inconvenience. From that time to the present, her health (with the exception of occasional colds) has been good.

She has taken a part of two boxes. Whether the relief which they have afforded is temporary or not, time only can determine. I feel thankful to the Giver of all good, that I was directed to the use of these remedies.

From this, and some other cases which have come within my own observation, I have no hesitation in recommending them to all who may be afflicted with scrofulous diseases, by whatever name they may be called.

I would, at least, say, try them.

Your's, &c.,
SAMUEL F. CARY.

Mr. Foulke, to whom the above letters were addressed, resides in Philadelphia—had been out of health many years, and a long time under the treatment of the *elite* of our art in that city, when he commenced the above correspondence (as I am informed) to ascertain what would probably be the effect of the remedies in his case. I am also informed that Mr. Foulke used the remedies, and that their effect in his case, fully justified the character given them by his correspondents.

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TUBERCULA OF THE UTERUS, LIVER, STOMACH, TONSILS, PALATE, AND CEREBELLUM.

Mrs. T. S——, of F., Butler Co., Ohio, aged 31 years. She came to see me, August 14, 1836, and said she had been out of health about 5 years. The examination in her case was commenced as usual, by an examination of the spine, and first, of the first cervical vertebræ.

Pressure on a small tubercle of the right side of it produced severe pain, which darted into the right side of the throat, and right side of the head. Pressure on the left side of it produced pain which darted into the left side of her throat. Pressure on the sides of the second joint also produced pain, which darted into the upper and front part of the neck. Pressure on the second, third, fourth and fifth dorsal, produced severe pain, which darted into the stomach. Pressure on the right side of the seventh, eighth and ninth, produced severe pain also, which darted into the region of the liver. Pressure on the third and fourth lumbar was painful. Pressure on the other cervical, dorsal and lumber vertebræ, produced no pain or effect whatever.

I now examined the line of glands along the neck, and under the jaws, and found them very much enlarged, and told her that her tonsils and palate were enlarged, and that she had dyspepsia, chronic inflammation of the liver, and leucorrhœa, besides swellings of some of her limbs.

She said that was right, and that the disease originated in the uterus five years before, and about a year after, it commenced in her liver, and in a few months after that, in her stomach; and that it was now nearly three months since her ankles and legs began to swell. It is now a year since her catamenia disappeared, and they have not since returned. On

examining her throat, I found the tonsils and palate very much enlarged, and the tongue one-third larger than natural. The tonsils were very sensible to pressure, and had, with the palate and rest of the throat, a dark red colour, and during the last few weeks the act of deglutition, or of swallowing solid food, had been difficult and painful. She had had more or less pain in the right side of her head with dizziness, during the last few months. She was also very pale, feeble and emaciated. A number of physicians have attended her one after another, for a long time, but the disease continued to make progress, and after years of suffering, which can only be appreciated by persons of her sex, she was in the last part of the last stage of disease, and death, under the common treatment, would soon have closed the scene. Prescribed, pills and plaster. One plaster to be applied over the first, second, and third joints of the neck and of a length sufficient to extend from ear to ear. One 5 inches wide and 16 inches long, to extend from the 6th joint of the neck, to the 10th dorsal; and another over all the lumbar vertebræ, and also to use the pills according to the directions in the pamphlet.

I told her, as I commonly do, that she *must* commence getting well immediately, and that in from three days to a week, she would notice it distinctly, and would in that time be able to eat any kind of food, with a good appetite, and without any disturbance of the stomach; and that in from eight to ten weeks she would be entirely well.

I never saw or heard of this patient, or her husband, before she called on me at the above date, and never saw or heard of her again until October 24, when in passing near her residence, I called to see her. Her husband, on my inquiring after her health, before I went into the house, told me, he "believed she was about well." On making the same inquiry of her, she told me she "believed she was entirely well;" and on my asking her if there was no mistake about it, she told me: "no, she thought there could be none," and asked me to "observe the difference in the colour of her skin, and the flesh she had gained;" and then presented to me one arm, to see how hard or solid the flesh was. She also observed, "that her catamenia had returned, and that she had been twice, since she saw me, as regular in that way, as she ever was;" and besides, "that she commenced work as usual when she was well, bout two weeks since, and had in that time done a great deal of work, which did not appear to injure her."

I told her that it all looked very fair, but that the change appeared so very great in so short a time, that I would like to examine her back, and see if there was no mistake about it. She told me I might as much as I had a mind to, for she "thought it was perfectly sound." I accordingly examined it in the usual way, and found she was right.

It will be observed that in describing the cases, and the effects of these

remedies, I have generally been very brief, but have said more of this case in consequence of its great importance to females ; for the disease generally commences in them at an adult age, in the uterus, as it did in this case, and then, after a few months or years, is extended to other organs and limbs.

The above case is not an uncommon one, for the day previous to the one on which I prescribed for this case, I was called to prescribe for another.

Mrs. W. F., of the town of R., aged 21 years, affected in all respects as in the above case, except that the tonsils and tubercles in the upper part of the neck were much larger. After, however, the common remedies had entirely failed in her case, she was induced to try the effects of travelling, and visited some of the principal eastern cities—got the advice of some of the physicians of those cities, and on her return, her husband came to me, and told me that "he wanted me to call and see her, as he had become satisfied that she must die, unless I could save her." I accordingly visited her, and commenced and went through with the examination of the spine in the same way, as in the case of Mrs S., and then described to her the disease in the different organs and limbs, and prescribed the same remedies. I then, as in the case of Mrs. S., told her she must commence getting well immediately, and the cure would continue steadily, unless it was retarded by colds, and that she must be well in ten or twelve weeks.

She did accordingly begin to get well as I had told her. I called once in two or three weeks to see her progress, and the last time, the day after I called on Mrs. S., and found her situation, in all respects like Mrs. S—'s, except that her tonsils and the tubercles under the jaws, although greatly reduced, had not entirely disappeared—and she was directed to continue the use of the remedies. *Dec.* 4. The tubercles, I have learnt from her mother, have disappeared, and her health is entirely restored.

Mrs. A. H., of Louisville, Ky., aged 21 years. She, like the above cases, had the disease affecting the liver, stomach, and uterus, and a few months since, her throat. She, like Mrs. W. F., after the use of a great variety of remedies, recommended by her physicians, went to one of the eastern cities. She, however, returned a few months after, and gradually growing worse, was in a few weeks confined to her bed. The disease continued to make progress, and in a few weeks more a number of physicians were called in consultation, but her symptoms continued to grow worse.

Magnetic pills and plaster were now prescribed. She began to get well immediately after, and in a few days was able to sit up and walk her room, and in two weeks was promenading the streets. It is now (Nov. 8th, 1836,) only five weeks since she commenced the use of these remedies, and although the usual time has not elapsed to perfect a cure, she has gained so much flesh and strength, as to make her appear to a stranger, as well, and in as good spirits, as any other person. Yet she is rather thin or slender, and has not regained her natural fleshiness, and pressure on the 1st and 2d cervical, 2d, 3d, 4th, and 5th, and 7th, 8th, and 9th dorsal, and 3d and 4th lumbar vertebræ, produced pain. Continued the remedies.

*December 16th.* Her face has now the full and rounded form, and she has fully regained her natural flesh. On applying pressure now, on each of the vertebræ, along the whole line of the spinal column, it produced no pain or effect whatever. Her health is now in all respects fully re-established, and I directed the remedies to be discontinued.

## TUBERCULA OF THE STOMACH.

### *Dyspepsia.*

The following scrap was cut from the *Cincinnati Whig*:—

GENTLEMEN: I noticed some time since, a communication, published in the *Cincinnati Whig*, signed by Dr. Lawson, in which he speaks with great confidence and certainty, of the good effects of "Sherwood's Remedies," as prescribed by him in his practice, in the cure of various forms of scrofula.

It gives me pleasure to add my own conviction of their efficacy in the cure of dyspepsia. For many years, this disease had preyed upon my constitution, and in the summer of 1836, and winter of 1837, my digestive organs had become so much impaired, that almost every kind of food, taken as nourishment, created the most intense suffering. My flesh had wasted away, and my whole system had become so much debilitated, as scarcely to give me strength sufficient to leave my room. I had become discouraged, and despaired of ever again regaining my health, and looked upon death as the only sure relief of my sufferings, Many of my friends and acquaintances, with the knowledge that my disease seemed to baffle the skill of several eminent physicians, had despaired of my recovery, and had made up their minds that I must soon be numbered among the dead.

At this stage of the disease, I was advised by some one to make trial of "Sherwood's electro-magnetic remedies." As a last resort, I was willing to lay hold of any thing that would relieve me, and lost no time in procuring a box, and commenced their use. In the course of a few weeks, I found my strength gradually to increase, and my food (such as my appetite craved) no longer gave me distress. My former

flow of spirits again returned, my slumbers became sound, and undisturbed by horrid dreams, and my constitution, in a short time, became restored to its former flesh, health, and vigor. It is now more than two years (1839) since I recovered my health, and have withheld giving publicity tomy case, until I could, without the fear of contradiction, speak of the permanency of the cure. I would advise, especially, all dyspeptics to lose no time in procuring these remedies, and to give them a fair trial. I am very confident they will not have cause to regret having done so If any person, afflicted with this disease, should wish for further information than herein given, if they will call on me, or address me by letter, post paid, if in my power, I will cheerfully give it. I have no interest, directly or indirectly, in the sale of the medicine.

Your's, respectfully,

CINCINNATI, JUNE 5, 1839. C. TOBEY.

### TUBERCULA OF THE TONSILS, PALATE AND TONGUE.

Master W. W., of Union, Butler Co., Ohio, light complexion, aged 17 years, called for advice, Nov. 25, 1835, and said he had been out of health some time. I now, without any enquiries, commenced an examination of the spine, between the first cervical vertebræ and skull, when he observed that it hurt him, and the pain darted into his tongue. I then pressed on the left side, in the space between the first and second vertebræ; when he observed again that it hurt him, and the pain darted into his throat. Pressure along the other joints of the neck and back, produced no pain or effect whatever.

I now told him that his tongue and tonsils were swelled, and that he had a cough and expectoration; and in looking into his mouth, found both tonsils (almonds of the ear) much enlarged, and in a state of ulceration,—the uvula [palate] much enlarged and elongated, and the tongue twice its natural thickness. On examining the submaxillary and cervical ganglia of glands under the jaws, and in the sides of the neck, they were found much enlarged. He is pale, and the emaciation is making progress. The disease commenced more than a year since, and he has been coughing and expectorating matter, more or less, during the last eight or nine months.

Prescribed, the magnetic remedies. The swelling of the throat and tongue soon began to subside, and in about six weeks the ulcers were healed, and his health was entirely restored in about five months from the time he commenced the use of the remedies.

The above was a very bad case of a disease to which clergymen are very subject, and which would have terminated fatally without the use of these remedies. I have prescribed them in many cases of this affection during the last three years, nine of which were those of clergymen.

Five of these are cured. Two were induced to stop the use of these remedies after two or three weeks, and substitute others, one of whom is dead. The other is, or was, travelling for his health, the last I heard of him. Two very bad cases are now under treatment, and are both very nearly well.*

### TUBERCULA OF THE TONGUE, RIGHT TONSIL, RIGHT LEG, AND RIGHT SIDE OF THE NECK.

Mr. G. A. F——, merchant, of Cleveland, Ohio, light complexion and slender frame, aged 34. His tongue began to swell, and to be sore and stiff or clumsy, in February, 1833; and in April following, his right leg began to swell. The swelling and soreness of the tongue continued to increase until the middle of May, when the leg had become very painful, and began to discharge tuberculous matter.

The swelling and soreness of the tongue began now to subside, and in a few days disappeared. The leg continued to grow worse, and confined him to the house much of the time for nearly four months; but after the use of a variety of applications, it healed about the first of December, of the same year, when he discovered a tubercle of the size of a chesnut in the centre and near the roots of the tongue, which about the last part of the month began to ulcerate, when he discovered another tubercle about three fourths of an inch from it, and this soon ulcerated, and others continued to appear and ulcerate, until the first of May, 1834. They then healed, and the swelling of the tongue became a little reduced, when the disease re-appeared in the leg, but in the back part of it, and with its accustomed violence, and began to ulcerate about the 1st of July. In August, the leg began to get better, when the disease increased again in the tongue, and soon began again to ulcerate; and a tubercle on the right side of the neck now suppurated, and began to discharge tuberculous matter.

He now went to the city of New-York for advice, where electricity was prescribed, and applied in different ways for about or nearly three months, during which time the ulcers of the tongue healed, and the tubercles on the side of the neck nearly disappeared; but on the left side of the tongue remained uninfluenced by the frequent and continued ap-

* In the cases were the uvula has been a long time very much enlarged and elongated, it should be cut off. I generally cut off about one half of it in such cases, to remove a constant source of irritation, which would otherwise greatly retard the cure The operation is a very simple one, and is never attended with any danger

plication of the electric shocks. The leg also during the use of this and other remedies continued to get better, and nearly healed. In two or three days after he had left the city of New-York, and discontinued the use of electricity, the tubercles on the side of the neck, and the one on the side of the tongue began to enlarge again, and in two or three weeks, two more appeared in the tongue and his throat began now to be sore and painful, and these symptoms continued to increase in violence.

On the 10th of January, 1835, he called upon me for advice. The right side of his neck was now swollen, tuberculated, and painful, and this pain frequently darted into the side of his face and head, and there were now two large tubercles on the left side of the tongue, and one about the centre of it, and one an inch from its apex, and three rising conspicuously from the right tonsil, which were very sensible to pressure, and with the swollen tongue produced painful and difficult deglutition.

Near the time the ulcerations commenced in the tongue, he began to feel lancinating pains in and through it, and they have continued with varying severity to this time; and all the tubercles that have appeared in it from time to time have invariably ulcerated, except the last three mentioned, and have left in it corrugated excavations.

There is now little or no swelling of the leg, and the tuberculous abscesses are all healed except one; but small tubercles of the size of small peas are felt under the skin in the back and front part of it.

He has suffered severely from this disease, and in one or two instances was reduced nearly to death, and has consulted and employed many celebrated physicians, all of whom called it mercurial disease, and prescribed, among other things, the compound sarsaparilla syrup, and cicuta, at a time when the disease was supposed to be terminating in cancer.

*Diagnosis.* Tubercula of the tongue, right tonsil, right side of the neck and right leg. Prescribed, magnetic pills and plaster. In less than one week, the tubercles in his tongue, tonsil, and neck, with the swelling of his neck, were very much reduced; and he now swallowed his food with much less difficulty, and the reduction continued; and at the end of two weeks the soreness of the throat had subsided, and he swallowed without difficulty; and at the end of four weeks, the tubercles and swellings of the tongue, tonsil, and neck disappeared, as well as the tubercles in the leg; and his health and flesh had increased so much, as to make him appear in perfect health.

Death from cancer of the tongue and throat, is, of all others, the most painful and most horrible, of which Mr. F. was advised, and for which he had been admonished to prepare.

The lapse of four years has shown the cure a permanent one.

CANCER OF THE LIP.

Miss M. H——, of ——, aged 17 years. Called early in the morning to see her, in April, 1817; and was requested to examine her under lip, which was swollen and ulcerated, and to give my opinion of its character, and after examining it and the lymphatic glands of the neck, which were tuberculated on both sides, I pronounced it a case of scrofulous cancer. I was then requested to say whether I "could cure it without cutting it out," and readily answered in the affirmative, and was then told by the female attendant, that, that was all they wanted of me, and that I was at liberty to return home as soon as I pleased, and accordingly bade her good morning, and returned home, perfectly in the dark, however, as regarded what was meant by this quixotic adventure. The next day, I was called again, and informed in explanation, that a celebrated surgeon had been attending the patient about two months, and as the lip continued to get worse, and had become very painful, he had advised them, a few days before, of the futility of all remedies, but the knife, and had set the time of ten o'clock of the day before to perform the operation; but they had dismissed him, and sent for me to perform the cure without it.

She was of the middling size, light and ruddy complexion, eyes rather large and prominent, and form of face approaching that of the Roman, and with perfect symmetry of body and limbs, was what may be called a scrofulous beauty, bating only this horrible lip.

Prescribed, magnetic pills and plaster.

In five weeks from this time the cure was perfect, and the tuberculated glands in the neck had gradually become smaller, and soon after disappeared.

This case, and the following one of the uterus, were apparently cases of scrofulous cancer. I have had a few other cases of the lip of the same character, and many of a similar nature, affecting the uterus, which were cured with these remedies, but which have apparently little or no effect on the disease in this form, when affecting any other part of the body. I have imputed their effects, in the cases of the lip and uterus, to the strong power of contraction which they possess, from the fact that the same results are obtained in cases where strong compression can be applied at the same time as in the case given of Mrs. H., of Union, Butler Co., Ohio.

*Menorrhagia terminating in Cancer.*

Miss P. F——, of——, of full habit and light complexion, aged 22 years; called to see her, May 16, 1812. She has menorrhagia, which commenced four months ago. I prescribed the usual remedies for many months, during which time, as before, she had been constantly confined to her bed: but all to no purpose, and it now became necessary to abandon the patient or commence a new treatment.

She had from the first complained much of pain and weakness in the small of her back; which was attended with leucorrhœa. I proposed now to examine her back, and applied pressure on and around the lumbar vertebræ, and this produced violent pain, which, on every repetition of the pressure, darted into the uterus, and they appeared to be the same darting pains we find in cancer of the breast.

I now prescribed the magnetic pills and plaster. The plaster over the small of the back, or lumbar vertebræ, with injections into the uterus of a strong solution of acetate of iron, by means of a catheter and small pointed syringe.

Her symptoms began to improve slowly from this time, and in about three months, a very thick membrane separated from the inside of the uterus, and was discharged from it, rolled up—round—half an inch in diameter, and two inches in length, which was presented to me in a paper, and on unrolling and spreading it out on a stand, it presented two tumors or bunches, of dark colored fungi near the middle or centre of it, —one of which was near the size and shape of a chesnut, and the other of the size of a pea, and flattened on the sides that adhered to the membrane, and at a distance from each other of half an inch.

These fungi were on the outside of the membrane, or that next the uterus, and adhered to and sunk deeply into it; and there arose out of their tops and sides small white or light colored substances of the size and appearance of small threads, and from a line to a fourth of an inch in length.

On examining the other side of this membrane, small holes or chinks were found opposite to these fungi.

In a few weeks after this, her health was restored. She married about a year after, but has had no children.

The following notice of the effect of my remedies, from the Rev. J. B Cook, was received after this work was stereotyped and going through the press. It was one of the cases under treatment before noticed, which became so bad while practising his clerical duties in the West, (Cincinnati and Covington,) as to compel him to abandon them entirely, and return to his friends in the east.

From the Christian Secretary.

HARTFORD, OCT. 30, 1840.

MR. EDITOR,—I send you a brief statement of facts relating to my recovery. This is done the more cheerfully, as I feel prompted by gratitude and by a desire that others similarly afflicted, may be as happily relieved.

I had been dyspeptic for many years, was afflicted with tubercula of the palate, neck and stomach; with chronic diarrhœa and piles; with general debility, and with chronic bronchitis, which extended from the glottis to both lobes of my lungs. During the last two years I have suffered so much from bronchitis that much of the time, speaking even in a whisper, has been so distressing as to oblige me to converse by writing. But now I am comfortably well, through the Divine blessing, on the use of Dr. Sherwood's Electro Magnetic Remedies. Some of the delightful changes experienced by me are the following:

From such a state of my throat and lungs that the utterance of a sentence distressed me, I have been enabled to preach eleven times during the present month, and conduct five other religious services. My strength and comfort have been, in the meantime, gradually increasing. The deep depression of spirits which, at times, seemed death-like, has given place to the animation and cheerfulness of youth. My blood, from having been almost literally black and thick, has become perfect in color and consistence. My palate, through the aid of a slight surgical operation, is reduced to its usua size. The glands of my neck, which were enlarged and painful, are now entirely reduced. The pain from my neck has passed off sensibly. The mucous membrane of the bronchia has been aided in its secretions. Dr. Sherwood's remedies have excelled every thing I have used as an expectorant. The inflammation of my throat, and the pain consequent upon it, have been allayed, and at times entirely gone. The same is true of the inflammation and pain in my bowels. Relief from hunger, by eating, though more immediate, is not more a matter of consciousness, than was my relief from pain, by the application of these remedies. From apprehending languor, consumption, a suffering life, and an early death, I have now the prospect of an active, and I hope, useful life.

To all afflicted with bronchitis, or tubercular consumption, or what is called scrofula, or dyspepsia, let me say that I do not believe that these diseases can long exist under the action of these remedies. They are not, in my estimation, to be classed with quack medicines, because, 1st, I believe them to have science for their basis. 2d. Their adaptation to individual sufferers is pointed out by symptoms which none need mistake; and 3d, Dr. S. is a regularly educated physician, who, having suffered from his childhood, was led gradually to the discovery of them for his own relief. Some think it a mark of wisdom to ridicule every thing new in medicine; as if the science and practice of it were stereotyped, however the Baconian philosophy repudiates the theories of every age and school which come in conflict with fact. I have stated simple verities In addition to my own case, I refer to B. S. Lawson, M. D., of Cincinnati, who was

restored from confirmed consumption, after all the common remedies had entirely failed. With gratitude to God for my recovery, I subscribe myself

Yours, J. B. Cook.

P. S.—I should add that Professor Bronson gave me essential aid in recovering the use of my voice.

The *Bronchitis* mentioned in this case was the consequence of tubercular disease of the throat and lungs; the reduction of which dissipated the disease of the mucous membrane of the throat and bronchial tubes.

I did not see Mr. Cook until he had taken one box of my remedies, when I suggested the necessity of his consulting Professor Bronson on the subject of the improvement of his voice, which I am pleased to learn has added another case to the Professor's long list of triumphs in his art.

The case of Mr. Cook was like that of many other clergymen who have been affected in the same manner, and who have been cured with the same remedies. At the time I saw him, he had the magnetic symptoms of tubercular disease of the lungs in addition to the disease of the mucous membrane of the throat (which was tuberculated) and larynx, which are absent in idiopathic bronchitis until the last stage of the disease, when they are sometimes present in consequence of the formation of tubercles, by obstructions in the lymphatic vessels, from disease of the mucous membrane of the bronchia. These symptoms, when they appear in such cases, are, however, slight and not at all proportioned to the intensity of the disease.

In twenty-two post mortem examinations of this disease, I found tubercles in seventeen cases in their different stages of formation and destruction. In some of these cases a few small tubercles only were found in an immature state, while in others they had become mature, and in some cases had softened down and produced one or more excavations.

These remedies have no effect whatever in idiopathic bronchitis, or in any other disease in the absence of the magnetic symptoms.

## CHAPTER VIII.

### TUBERCULA OF THE SPINE.

Miss E. B., of Stratford, Conn., aged twelve years. I called to see her in Dec. 1839, and on an examination found a lateral curvature of the dorsal vertebræ, a portion of which extended under, and raised the right shoulder blade. The right hip was also raised above the left, and her health and strength much reduced.

Prescribed, the magnetic remedies. The plaster to extend the whole length of the spine. The weight of her body was also directed to be suspended by her arms, with any simple contrivance, as by taking hold of a stick suspended from a ceiling, a few minutes, five or six times a day.

I called to see her again the last part of April, 1840, when, on examination of the spine, it was found to have resumed its natural position, and her health and strength perfectly restored.

The curvature commenced in this case about a year and a half before I first saw her in December, and gradually increased to the extent above mentioned. The result of this practice in such cases, is constant and uniform. In other cases, of many years continuance, little or no change is produced in the curvature, for obvious reasons, by this practice or any other, and the only benefit resulting from the use of these remedies in

these cases is the reduction of the disease in the spine, and also of the stomach, liver, or lungs, almost constantly accompanying curvature of the spine.

I frequently find such patients harnessed with cushions and splints, but regarding them as worse than useless, I always remove them.

Note E.

TUBERCULA OF THE SPINE.

*Caries of the Vertebræ and Distortion of the Spine.*

Master W. H. F., of the City of New York, of light complexion, aged 6 years. His parents brought him to me in Sept. 1837, with white swelling and distortion of the spine from tubercular disease of the eleventh and twelfth dorsal, and first lumbar vertebræ—the last dorsal projecting backwards, and it was with great difficulty he could maintain himself in an erect position. The disease (in which the common remedies had been used without benefit) commenced about two years before that time with pain in these vertebræ, which still continued with intervals of abatement, during a few weeks, when it would sometimes return with such violence as to produce spasmodic symptoms.

Prescribed, magnetic remedies.

His health soon began to improve, and in about six months it was entirely recovered. I examined his back a number of times during the summer and fall of 1838, and also on the 15th of June, 1839, and found it perfectly sound and strong, and he walked as erect, and appeared as well, as any boy of his age.

TUBERCULA OF THE SPINE AND NECK.

*King's Evil, and White Swelling of the right side of the Spine.*

Master J. M. S——, of Union, Butler county, Ohio, aged seven years. I was called to see him, August 3d, 1833. He had a white swelling on the under jaw of the right side, and a number of large tubercles on the same side of his neck, and a white swelling on the right side of the lower dorsal vertebræ, (back bone,) and it was now about three weeks since the disease commenced. Prescribed, magnetic pills and plaster In six weeks the white swellings disappeared, and his usual good health was re-established.

*September 23d*, 1833. Prescribed for Master W. C., the brother of Master J. M. S——, aged 4 years. He had a white swelling of the neck, and lower jaw of the right side, over tubercles on the same side of

the neck. Prescribed, magnetic pills and plaster. In five weeks the swellings and tubercles had disappeared. His health continues good.

The case of J M. S——, under the common treatment, like the following case of Master J. S——, would have terminated in distortion of the spine and lumbar abscess. This disease always commences with white swelling on the front or back side of the spine.

### TUBERCULA OF THE SPINE.

*Distortion of the Spine, Lumbar Abscess, White Swelling, &c*

Master J. S——, of Sycamore, Hamilton county, Ohio, aged twelve years. I was called to see him October 24th, 1832. He has tubercles of different sizes, on both sides of his neck, and it is now six years since they first appeared, and his health began to decline; and he had now a distortion of the spine (back bone) ninth dorsal vertebræ, which formed an obtuse angle backward; and the lumbar vertebræ, (joints of the back bone belonging to the small of the back,) from this point to the os-coccyx, inclined to the right side, so far as to form nearly a half circle; which with the whole left side of the back, was occupied with a large lumbar abscess. The distortion of the spine commenced three years before, with white swelling on the right side of the spine. He had also a white swelling on the left thigh, and a very great enlargement of the abdomen, produced by an enlargement of the mesenteric glands. The lumbar abscess had been discharging scrofulous matter about two years, which now amounted to more than half a pint in every twenty-four hours; and he was so much emaciated as to make his face, chest and limbs, except the left thigh, appear precisely like a skeleton covered with a thin skin. He had a severe cough, and was expectorating freely, and had hectic fever, night sweats, and diarrhœa, with irregular vacillating pain in the chest and stomach, which was much increased by the little food he was able to swallow; and he was now, and had been for the last two months, so feeble as to be unable to move his head, body, or limbs, excepting only feeble motions of his arms. Three physicians had prescribed for him, at different times, without apparent benefit. Prescribed, magnetic pills and plaster. His health, in a few days, began slowly to improve, and the quantity of matter discharged from the abscess gradually became less, and his cough, expectoration, fever, night sweats, and diarrhœa gradually disappeared, and his strength improved. In May following, the discharge from the abscess was reduced to a teaspoon full in twenty-four hours, and the lumbar vertebræ had resumed their natural situation, in a line with the dorsal; and the enlargement of

the abdomen had disappeared; and on the first of August he was able to walk.

There was in this case a loss of bony substance in the dorsal vertebræ, by the ulceration, and the matter formed by it passed down along the facia of the psoas muscle, and through the groin into the upper part of the thigh and produced the swelling or abscess there. There was also a loss of bony substance by ulceration on the left side of all the lumbar vertebræ, and the matter discharged from these produced the lumbar abscess, and these losses of bony substance was the cause of the distortion of the dorsal, and of the obliquity of all the lumbar vertebræ.

EXPLANATION OF THE SUBJOINED CUTS.

Fig. 1 represents the case of Master J. S., as it was when I first saw it in October, 1832. A, lumbar abscess, with four openings, from which matter issued. B, psoas abscess, situated in the upper and inner part of the left thigh. CC, abdomen distended by tuberculated intestines and mesentery. DD, line of cervical glands, tuberculated on both sides of the neck. See the description of it, page 91.

Fig. 2 represents the same case as it was when published in June, 1834, and as it now is. The distortion of the ninth dorsal vertebræ backward, will be seen as in Fig. 1, and the tenth dorsal fallen down on its side, or nearly so; and it would be difficult to tell, according to Mr Sanson's views of such accidents, where that portion of the spinal marrow is, that once passed through its centre.

Caries of the vertebræ is the consequence of tubercula, or white swelling of the vertebræ.

The disease it will be seen by an examination of the preceding cases, is easily distinguished by the new and natural symptoms in any of its stages, and easily cured by the natural remedies, and as a knowledge of these facts is of great importance to the community, I shall give copious extracts from a lecture on caries of the vertebræ, by M. Sanson, of the Hotel Dieu, who is one of the most distinguished surgeons in Europe, and was delivered before one of the most learned, and most numerous forums in the world, for the purpose of showing the great difficulty in distinguishing tubercula or scrofula, in this, as well as other parts of the body, by the common symptoms, and the common erroneous views of the disease, with the absolute uselessness of the common treatment for it.

M. Sanson was a candidate for the vacant medical chair in the university of Paris, occasioned by the death of Baron Boyer, and this lecture was a trial of his learning and skill, in an immense amphitheatre, before

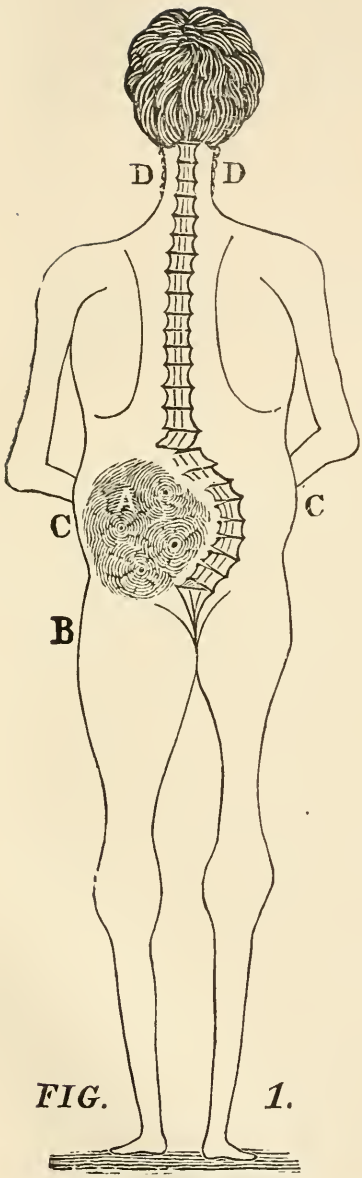


FIG. 1.

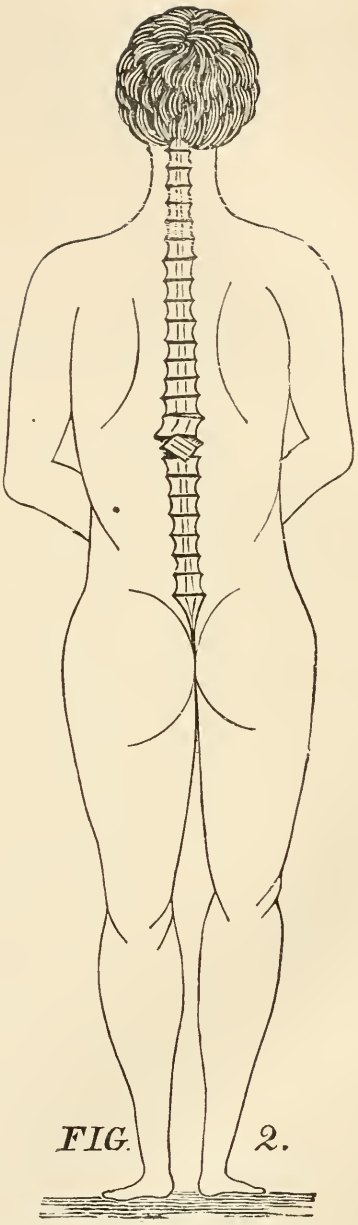

FIG. 2.

the faculty of medicine, who were his judges, and more than 2500 students, and has been published and lauded in the medical journals of Europe and this country, and is consequently generally esteemed the very best authority on the subjects of which it treats

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1. Lecture of M. Sanson at the Concours of Paris, in June, 1834.—The two patients who fell to the lot of M. Sanson, were placed at No. 19, Salle St. Martha, and No. 12, Salle St. Jeane, *Hotel Dieu*, and afforded subjects for the following lecture:—

*First Patient.*—Caries of Lumber Vertebræ.

Gentlemen: The first is a child eight years of age, of a lymphatic temperament; his skin is fine and white, the abdomen much developed; the hair light coloured; in a word, he presents the characteristics of what may be called a scrofulous beauty. The family of this child is, according to all accounts, healthy, and he himself has enjoyed a good state of health until within eight months of the present time. At that period the patient first experienced some pain in the region of the loins, which remained for some time, I cannot tell exactly how long, as the answers of the child were not very precise on this point; the pains were not accompanied by any feebleness of the lower extremities, or symptoms of any organic affection. After a few months a tumor made its appearance at the upper part of the thigh, and was at first accompanied by pulsations, which have since disappeared. The swelling gradually increased in size, and is now as large as two fists. When examined by the hand, there is an evident feeling of fluctuation, and its volume is influenced by the position in which the patient may be placed. Thus, when the child lies down on his back, the tumor becomes less tense than in the upright posture, and if we press the hand flat on the thigh, the contents are displaced, and ascend into the illiac fossa; hence we may conclude the existence of a large cavity, filled with a liquid matter. I should remark that the skin is not adherent to the surface of the tumor, but is moveable on all points of it. The child, as was before remarked, seems to enjoy still a good state of health; he is not affected with diarrhœa or sweating; his appetite is good; sleeps sound; he walks without experiencing inconvenience, and the affection is as yet completely local. The sister of the ward says he has coughed for the last three months; this led me to examine carefully the state of the chest; on auscultation we could not discover any symptoms of the presence of any tubercles in the lungs; the respiration, on the contrary, was healthy; there was no matity upon percussion at any point of the thorax; the only abnormal sound was some mucous rale, indicating a chronic catarrh, but this was slight, and the expectoration was by no means abundant.

What, we ask, is the nature of the disease under which our patient labours? It may be laid down, as a general rule, that when you have a tumor presenting itself at the upper part of the thigh, after a continuance of lumber or dorsal pains, the existence of caries of the vertebral column is very probable. The diagnosis is sometimes, however, accompanied with difficulties; in the present case, indeed, we are assisted by a leading symptom, for we have a slight gibbosity of the lumber vertebræ, and hence we are justified in concluding that the vertebral column is affected; we should, however, in all cases, wait for the formation of an abscess, before we give a decided opinion, because in

many circumstances, as in the case of a fall on the loins, accidental injury, &c., we have often the symptoms of vertebral disease, although no caries exist. But our patient was not affected by any accident of this kind, and the pains commenced without any appreciable cause.

Let us begin by endeavouring to determine the origin of the disease in the present instance. Rachitis is a very frequent cause of softening of the vertebral column, and this often produces the angular curvature; so much so, that many practitioners regard the angular curvature as a characteristic of rachitis, hence much doubt on the origin of the affection must exist, until caries has actually set in. But we have to remember that rachitis has a set of symptoms by which it is distinguished; it is a general constitutional disease, not a local one; rachitic children are feeble, and mostly sunk in a state of *abatement* and depression of spirits; they exhibit an indifference to what passes about them, while, at the same time, there is a precocity of mental powers, which is very remarkable; the gastric organs are usually affected in this disease; the mesenteric glands are engorged; the child has often diarrhœa, with a slow fever, or an acceleration of the pulse towards evening, he is pale, the lower jaw projects, and he gradually gets thin and pines away. Now we remark none of these symptoms in our patient; his health has been good, and we have, besides, another proof that his affection does not derive its origin from rachitis, besides we find the characteristic signs of an abscess by congestion. We have, therefore, in the present case, a formation of pus in the cellular sheath surrounding the lumbar nerves, or psoas muscles, and passing down as far as the thigh, where it presents itself; this matter is of an inflammatory origin. He first had pain in the part for a considerable period, and then the formation of pus which is now making its way to the exterior along the sheath of the muscles; the disease, in a word, is caries of the vertebral column, with abscess by congestion.

But we do not find here the symptoms which most commonly accompany caries of the spine. In most cases the disease commences by vague pains in some one point of the vertebral column; these become worse, and the patient soon experiences some difficulty or loss in the power of the locomotive system. Thus, if the disease commence in the lumbar region, the curve of the spinal column begins there, and the patient's movements are embarrassed in consequence of the influence which the change of form exercises on the action of the nerves; the general position of the patient is very characteristic of the affection under which he suffers; the head and neck are thrown back, and the legs are bent in such a way as to produce a most uneasy position. If you remark the child when he walks there is no action of the thighs, he seems to walk merely with the lower leg. When the bodies of several vertebræ are engaged in the disease, the spinal marrow may be pressed on in a moderate manner, and certain symptoms, as subsultus tendinum or convulsive movements of the muscles indicate this complication; the patient feels a weakness of the lower extremities; if he sit down or attempt to lift any thing from the ground, he is compelled to bend the limbs gradually, and dip down with a slow motion. The child whom we had to examine, did not present any of these accidents; he walked well, as has been remarked, and did not show any impediment of motion.

Whence arises this exception from the accidents usually accompanying caries of the spine? The reason is that he has several of the bodies of the vertebræ affected at the same time; when only one is diseased, the curvature which results is angular, and the pressure exercised on the spinal marrow is consequently more sudden and violent, giving rise to convulsions, paralysis, or retraction of the limbs. The compression of the spinal marrow is not the only cause of the disorders which we sometimes witness in the organs of locomotion; inflammation may come in as an accessary cause, extending from the bodies of the affected vertebræ to the membranes, and from the latter to the spinal marrow itself. We have, therefore, in the present case, caries of the vertebræ, and

abscess by congestion. The caries occupy many vertebræ together ; for if we examine the state of the spinal column we find a gradual bend, quite different from the sudden angular curvature when one vertebræ only is diseased ; and this circumstance fully explains the little or no difficulty of motion which our patient experiences, his upright posture in walking, and the freedom from all unpleasant or dangerous accidents.

The question now arises, what is the cause of the disease in the present case ? The exciting causes of caries of the vertebral column are in general difficult to discover. Our patient's father is a tailor, and his children have been accustomed to spend their time in a low, ill-ventilated shop. This may be the origin of the scrofulous affection under which he now suffers, and although the cause is not very well marked, yet the bad habit of body, contracted by living in an unwholesome place, is sufficient to excite the disease.

In what state is the vertebral column ?

The affection sometimes commences in the bodies of the vertebræ, and then we have them only inflamed. If it persist for some time, the weight of the body begins to act on the altered and softened bone, breaks it down, and a curvature, more or less prominent, is the consequence. But in our patient we have not only inflammation of the bone but suppuration also. The disease is not confined to a simple ramollissement ; the spongy tissue of the bones has become fungous, purulent matter is secreted by them, and a large cavity exists, filled with that fluid. If we had an opportunity of examining the state of the parts which transmit the pus from the seat of the disease to the exterior, we should find a long channel, hallowed out through the cellular sheath surrounding the muscles ; the channel is lined throughout by a membrane which constantly secretes pus, and is called by surgeons puro-generative (*puro-genie.*) In its structure it resembles somewhat that of the mucous membranes.

How does the disease terminate ? (Here M. Sanson entered into an extensive examination of the different ways in which caries of the spine may end, and of which we need give but a very faint outline.) The affection in the first place may go on and become daily worse ; the inflammation extends to the membranes of the spinal marrow, and to the medullary substance itself ; we have then the developement of a new set of symptoms ; motion becomes irregular and interrupted, and paralysis is finally established. The patient is now confined altogether to bed, his health is completely destroyed, the long-continued pressure brings on gangrene of the buttocks, &c., and death ensues. In many cases, however, the purulent collection opens by a small abscess in the thigh ; the opening is often very minute, but this does not prevent the entrance of atmospheric air into the cavity. The patient soon presents severe typhoid symptoms, from the degenerescence of the purulent contents of the abscess ; his lungs are attacked, and on examination, we find tubercles, which, perhaps, we did not before suspect or discover ; diarrhœa now sets in, and he soon sinks in a state of exhaustion. In other more favorable cases the termination is of a different character. The tissues surrounding the diseased and carious vertebræ furnish a bony matter, and the destruction of the hard parts is in some degree repaired ; the pus becomes concentrated and dries, the abscess contracts, and its sheath is gradually changed into a kind of canal, which no longer secretes puriform matter, and is at length totally healed, or the abscess may open externally, and terminate like any other abscess in a different part of the body ; however, in most cases, where the abscess thus opens spontaneously, it becomes fistulous, or the patient dies.

Let us now consider the treatment which should be adopted in the present case. If we look to the general health of our patient, we find it very favorable ; his constitution is good, there is little or no pain, and we may say that he is in a promising state, and that the affection under which he labours is as simple as it is capable of being. He has, in fact, no fever of any kind, he does not suffer from diarrhœa or hectic perspirations, and

there are no symptoms of constitutional derangement. The pain in the lumbar region has considerably diminished, and the abscess has not yet opened externally. There are, however, on the other hand, some unfavourable conditions in the present case; thus, for example, if the extent of the caries, by destroying several of the bodies of the vertebræ, has the effect of preventing any injurious pressure on the spinal marrow, yet a greater quantity of osseous tissue is necessarily affected, and the labour of regeneration will be more difficult or uncertain; and again, although, on examination of the chest, we found no signs of the existence of tubercles, yet, from the child's general appearance and temperament, we may fear their formation at a subsequent period. Hence the prognosis in the present case must be guarded, and the chances of a cure are perhaps, less numerous than those of a fatal termination.

Sometimes the caries of the vertebral column is superficial, and we may attack it with a reasonable hope of attaining a successful result; but not so in the case of our patient The disease has already existed for too long a time, and the lesion is too profound. What then are we to do? It may be remarked, in the first place, and as a principle of treatment, that the affection is originally an inflammatory one, and hence the antiphlogistic treatment should form the principle we ought to have in view. When I mention antiphlogistic treatment, I do not refer exclusively to bloodletting and debilitating measures; these only form a part of it, regarded as a whole. I allude to another and an important branch, viz., the revulsive part, which is included in the term antiphlogistic treatment, and not to the sanguineous, which, in most cases, is not to be thought of.

The first means I would employ is the moxa; this is a most powerful and efficacious external irritant, and we may apply it over various points of the spine, so as to multiply the foci of irritation, according to the method recommended by Baron Larrey; he has often placed thirty or forty moxæ along the spine, and this application has been attended with very remarkable success.

At the same time that we attack the disease by local measures, we should not neglect general constitutional treatment. Our first and principal object should be to correct the scrofulous temperament, which is strongly marked in the patient; this is to be done by the treatment with which every one is familiar; the child should have good, nourishing, easily digested food; he should live in a wholesome atmosphere, exposed to a fresh healthy air; he should take gentle and constant exercise, &c., and we may aid these means by the administration of bitters, if indicated.

Here M. Sanson entered into the different modes of treating the abscess, which is unimportant, and unnecessary to notice, and then passed to the consideration of his second patient, with lymphatic engorgement of the breast, which I propose to notice at a future period.

It will be observed, that after describing the common symptoms in this case, M. Sanson asks, "what is the nature of the disease? and after observing that "the diagnosis is sometimes accompanied with difficulties," acknowledges that "in the present case" he is "assisted by a leading symptom, a slight gibbosity of the lumbar vertebræ." It excited, however, so little attention, in his examination of the case, that he forgot to mention it in his description of the symptoms.

The nature of this gibbosity, or swelling, and the sympathies excited by it, could not, therefore, have been known to the learned author of this lecture, for in such case, the natural associations of his mind would have

led him to a critical examination of it, and of the cervical and submaxillary glands, which he would have found tuberculated.

These swellings of the vertebræ and tuberculated glands, may always be found in the first stage of the disease, as well as the last, and should always be decisive of its nature, and consequently we never should do as he says, "wait for the formation of an abscess, before we give a decided opinion," but on the contrary, we should commence our treatment immediately, to remove the disease in the first stage, and prevent the formation of caries and abscess, and their deplorable consequences.

He labours to show that caries of the spine has an inflammatory origin —tells us that it is different from rachitis, (rickets) because, in this case, "we find the characteristic signs of an abscess by congestion,"—tells us, also, of "the bodies of the vertebræ" being "inflamed"—that "in this case, we have not only inflammation of the bone, but suppuration also" —that "this matter has an inflammatory origin," and repeats again and again, that the abscess, "is an abscess by congestion."

In replying to these vagaries, (for such they really are,) it may be useful to observe, that in this disease, we rarely see two cases precisely alike, and that the common symptoms, are always varied according to the different parts, situation, and number of the vertebræ affected, and by its almost constant complication in some of its stages, with tubercula of other parts of the system, and that the idea of the abscess being "an abscess by congestion," or inflammation, and the vertebræ, or "bones," being "inflamed," or in a state of inflammation, and that "the affection is originally an inflammatory one," is all visionary theory, and the old visionary theory too, of the schools which was never favoured with the evidence of its real existence in chronic diseases.

The abortive attempt of M. Sanson to show a distinction between the disease in this case and rickets, will be seen on comparing it with the case of Master J. S., who, besides an abscess in the upper part of the thigh from caries of the vertebræ, as in this case, had also the common symptoms of rickets, or those given as such by M. Sanson, at the same time, which demonstrates their unity; and yet Mr. Sanson describes the same symptoms, to show they are different diseases. His description of the common symptoms of both, is consequently lame, confused, irregular and unnatural. There are really, therefore, no such diseases as are here described by M. Sanson, as nature is necessarily uniform in all her works.

His treatment, it will be seen, corresponds with his theory. It is "the antiphlogistic," or debilitating treatment, "in which bleeding forms a part," and the same that is pursued in chronic diseases of the organs and limbs. It is founded on a theory that was formed, like many others, with a very superficial knowledge of the construction of the elementary

organs, and of the motions of the elementary and compound organs, and without the least knowledge of the causes of these motions, or of the great sympathetic motions by which these are regulated and sustained, or of the natural remedies founded on a knowledge of these causes and motions—a theory which has consigned its millions to a premature grave. And the few that nature has been able to sustain against the combined influence of the disease, and this treatment, may be seen in our towns and cities,—some pale, sallow, feeble, and emaciated, and others with distortions of the spine, and tuberculated and amputated limbs, and who have long been perpetual monuments of its folly. Hence the cause of the grave scepticisms of some, and the ridicule of others, in regard to the real usefulness, or great importance of the medical art,—of the great number of nostrums for these diseases,—of the mazes of Doct. Philip,*—the visions of Prince Hoenlohe, and of the *very learned* theory, and *very scientific* atomic, or seventy-thousandth-part-of-a-grain-practice, of the great German professor.

The cases before noticed of Master J. M. S. and Mr. W., like that of M. Sanson's, commenced with a small gibbosity of the vertebræ, and both would have terminated, like his, in caries and abscess, under the common treatment, or that recommended by M. Sanson. The case also before noticed, of Master J. S., was so much worse than that of M. Sanson's, as hardly to admit of a comparison, and yet he is preparing himself for a public teacher, while M. Sanson acknowledges, that the "lesion," in the case of his patient, although so comparatively trifling, is from his knowledge of the dependence that can placed on the common treatment, "too profound" to give "a reasonable hope of attaining a successful result."

The disease, in the case of Master J. S., after it commenced in the dorsal, was gradually extended to the lumbar vertebræ. An abscess was formed in the upper part of the thigh, and on the back, by the matter discharged from the carious bones; and the disease propagated to other organs. And with caries and distortion of the ninth dorsal; and caries and obliquity of the last dorsals, and all the lumbar vertebræ—with tuberculated stomach, intestines and mesentery; and tuberculated and ulcerated lungs—with the motions of his body and limbs paralized, and his legs flexed, in right and obtuse angles, from compression of the spinal marrow; combined with great precocity of intellect, hectic fever, night sweats, diarrhœa, and a frightful marasmus; presented the most appalling effects of this disease, and of the common remedies.

Under the use of the natural remedies, the further progress of the

* Dr. Philip imagined he could distinguish chronic diseases of the different organs by the pulse.

disease was stayed—the tuberculations reduced, and the work of re-formation commenced, to replace the great loss of substance; and he slowly, but gradually, arose from his most deplorable position, and stood erect, and remains, like many similar cases, a monument of the value of the simple and natural remedies, indicated by the really simple nature of the disease, and of the futile nature and folly of the common treatment.

Acute or inflammatory diseases, requiring the antiphlogistic treatment, run through their course, and terminate in a few days or weeks; but contra, or chronic diseases, are slow in their progress, and continue many weeks or months, and sometimes years, before their termination, and require a treatment entirely different, as every body knows, except physicians, who, in spite of the every day evidences of their own senses, still adhere *scientifically*, to the old unscientific theory and practice of the schools.

This case, and lecture, are is full of instruction, and it should never be forgotten, that the reason which induced M. Sanson to advise to wait for the formation of an abscess, before we give a decided opinion in such cases, is the consequence of the great difficulty in distinguishing chronic diseases in their early stages by the common symptoms. The deplorable consequences, resulting from this necessity, must be apparent to all, for instead of attacking and reducing the disease in the first stage, when affecting the spine, organs, or limbs, we must wait many weeks or months, and sometimes years, for the formation of an abscess, before we can, by the common symptoms, "give a decided opinion," or commence the proper treatment; or until the disease is so far advanced, as to preclude, in a great majority of cases, "a reasonable hope of attaining a successful result."

### TUBERCULA OF THE NECK.

### *King's Evil.*

Master John Watson, of the City of New York, aged eighteen years. He had large tubercles on both sides of his neck, and in the last part of November, 1838, a general swelling commenced over them, and gradually increased to December 19th of the same year, when they had become very large. He then commenced the use of the magnetic remedies. Matter was formed in the swelling on the left side, which broke and discharged scrofulous matter six or seven weeks. The abscesses then healed, and the swelling with that on the right side of the neck, entirely disappeared in about six months from the time he commenced the use of the remedies. His health was then re-established, and has continued good to this time. *Sept.* 1, 1840.

## CHAPTER IX.

### TUBERCULA OF THE JOINTS AND LIMBS.

In consequence of there being no generally known remedy for tubercula, it is the practice in this country, and in Europe, and in the hospital and country practice, to amputate or cut off the limbs in cases of tubercula, or white swellings of the joints or limbs, whenever the disease is supposed to have advanced so far as to endanger life. The relief in such case is, however, generally very temporary, as the disease is commonly soon developed in another joint, limb, or organ, and such patients consequently receive, from such severe operations, but a brief immunity from pain and death. In the case given of Mr. J. S., of Preble county, the thigh was amputated for a white swelling of the right knee; but the disease soon after attacked him in the left hip, and then in the left foot, when that of the hip became passive. If, in this case, the left leg, like the thigh of the right side, had been amputated on account of the disease in the foot, according to the common practice, the disease in the hip would have quickly become active, and Mr. J. S. soon numbered with the dead.

This case, with that of Miss M. G., of Springfield, with acute white swelling of the heel; and Master W. L., of Madison, with the disease in all the limbs and many of the joints, with a great variety of similar cases, show what is effected by the natural remedies, without amputation. And I may here remark, that on examining the cases of amputa-

tion for tubercula of the joints and limbs, reported in the *London Medico-Chirurgical Review*, during the last ten years, and including those that are called by different names, but really the same disease, there can be little or no doubt, but at least three-fourths of the number would have been rendered unnecessary, if the use of these remedies had been commenced, even at as late a period as that in which the operations were performed. And this opinion is hazarded with the full knowledge of the fact, that these reports were principally from the Hospitals of London and Paris, and that these operations were performed by, or with the advice of physicians and surgeons, who rank among the first members of our profession. The tuberculous or scrofulous diathesis or taint, is destroyed by the natural remedies, but remains in the system after these operations, and the disease is propagated to other organs and limbs.

### TUBERCULA OF THE LEFT KNEE, STOMACH, AND LEFT LUNG.

*White Swelling, Dyspepsia and Consumption.*

Master Alexander Benedict, of light complexion, aged 15 years, came into my office on crutches, in June, 1837, accompanied by his father. On examining the son, I found he had a white swelling of the left knee, and tuberculated stomach and left lung. The disease commenced in the knee about five years before, and progressed gradually under the treatment of the best physicians and surgeons of this city, until February, 1837, when the disease commenced in the lungs, with cough and expectoration, which still continued, and he was then pale, feeble and emaciated. Prescribed the magnetic remedies. I heard no more from the case until October of the same year, when he called at my office with his father in perfect health. The white swelling of the knee, with the cough and expectoration, had entirely disappeared, and he had gained so much flesh and strength as to make him appear in as good health as that of any other person, and his health has continued good to this time.

NEW YORK, JUNE 8, 1840.

I have read the above description of the case of my son, and will add to it the fact of my having paid to the best physicians and surgeons of this city, about a thousand dollars for their attendance on him, and that they had given up the case, and told me that he could not be cured, but must die ; when a gentleman, (Mr. Baker) advised me to take him to Dr. Sherwood ; I did so, and got him cured at last, as stated above, for ten dollars.*

SAMUEL BENEDICT,
No. 2 Merchants Exchange.

* I have had a great number of similar cases which have terminated in the same manner, and in which from fifty to five hundred dollars has been first paid to other physicians and surgeons for their attendance upon them.

ACUTE TUBERCULA OF THE ANKLE JOINT—ACUTE WHITE SWELLING OF THE ANKLE JOINT.

Master John Lepine, of the City of New York, aged 12 years. He began to have severe pain in the right ankle joint, about the first of January, 1840, which was soon followed by swelling, and, in a few weeks, matter was formed and discharged from the left side of the joint, which matter was a thin sanies mixed with cheesy concretions. He was treated by a physician of this city in the usual manner, until the 18th of March, without any other effect than a palliation of the symptoms. At this period he commenced the use of the magnetic remedies.

Under their use the character of the discharge from the ankle joint was changed, in a few days, from a thin sanies to a thick yellow matter, which soon began to decrease in quantity, as also the swelling, and in the course of six weeks he was able to draw on his boots and walk about, and has continued to do so every day since that time. I saw him and examined the ankle to-day (June 8th)—the swelling and pain have subsided, and there only remains a very slight discharge from a small orifice in the skin, which will be closed in a few days.

*July 27th.* A small piece of bone was discharged from the orifice a few days after the above date, when it closed, and the ankle is now perfectly well.

I have received many letters of commendation for the success of my practice in chronic diseases, and cannot well resist the temptation to publish the following from a lady of this city, who is anxious to add her testimony to the benefits resulting from the use of my remedies.

NEW YORK, SEPT. 7, 1840.

DR. SHERWOOD,

SIR: Having been informed of your intention to publish a pamphlet, containing an account of cures performed by your magnetic remedies, I deem it important to lay before the public a statement of your success in the case of my son. He had injured his spine by a fall from his chair about two years previous to your undertaking the cure of him, and had suffered much from the disease which ensued, as well as from the remedies of various physicians, with no material benefit, until the application of your remedies, when his recovery was rapid, and he is now in the enjoyment of perfect health.

The handsome manner in which you so disinterestedly came forward to the assistance of several poor people in our neighbourhood, particularly in your successful treatment of an aggravated case of white swelling of long standing, will be long remembered with gratitude, and must establish the superiority of your remedies in cases of the above character. Certain that to your exertion I am indebted for the life of my child, I wish you all possible success in the heavenly art of healing the sick.

Respectfully yours,

*____**_____*

The first case referred to by this lady, was that of a white swelling and distortion of the spine; and the last, a very bad case of white swelling of the knee of a young lady of six years standing, which had resisted both the hospital and private practice.

## TUBERCULA OF THE JOINTS AND LIMBS.

### *Ulcers, White Swellings, Abscesses, and Caries of the Bones.*

Master W. L., of Madison, Butler county, Ohio, aged eleven years. I was called to see him, May 29th, 1833. He had scrofulous tubercles, and a scrofulous ulcer on both sides of his neck, a white swelling of the left arm, between the shoulder and elbow, and another of the left ankle. He had also a white swelling of the right knee, and also of the right ankle, and another of the third joint of the fore-finger of the right hand. The white swelling of the left arm was discharging scrofulous matter from abscesses in four places, and that of the left ankle in two places, and that of the right ankle, and that of the hand, in one place each.

The disease commenced about a year and a half before, first with white swelling of the right knee, and the other swellings, ulcers and abscesses gradually appeared as the disease advanced. He was now confined to his bed and unable to walk, was feeble and emaciated, entirely deaf, and suffered much from pain, mostly at this time in both ankles and the left leg. Prescribed the magnetic pills and plaster. The pain in his limbs began to subside in a few days, and his health to improve; a piece of bone two inches long, half an inch wide, and three-eighths of an inch thick, separated from the bone, and was removed from the left arm. The white swellings gradually became less, and in six weeks he was able to walk about in the fields. The swelling of the thigh terminated in abscess; I opened it, and it discharged about three gills of matter, and then healed rapidly. *November 1st*, 1833. The white swellings have all disappeared, and the abscess and ulcers healed, and his general health is good.

His jaws were so nearly closed as to only admit a finger between them. All the teeth on the under jaw of the left side came out, and also a part the jaw bone, the whole length of the jaw in which the teeth were set, and there has come out of the same place an entire new set of teeth, and he can now open his mouth as wide as he ever could, and, besides, there has come out of the roof of his mouth a number of small pieces of bone

Pieces of bone also came out of the upper end of the tibia (shin bone) of the right side, from the left ankle joint, the left clavicle, (collar bone,) the mastoid process of the right side, (bone that projects under the ear,)

and from the under jaw bone of the right side; and the right leg was drawn back so as to form nearly a right angle with the thigh, and the left so as to form an obtuse angle.

### TUBERCULA OF THE KNEE AND MESENTERY.

Mr. D. C., of Springfield, Hamilton county, Ohio, farmer, aged thirty-nine years, came to me October 15th, 1832, with white swelling of the left knee, and enlargement of the abdomen, which we supposed to be dropsy, but it was evidently caused by enlargement of the mesenteric glands. His health has been declining more than a year, and the enlargement of the abdomen commenced about a year, and the swelling and pain in the knee, which now rendered him a cripple, about four months before. Prescribed the magnetic pills and plaster. In five weeks from this time the swelling of the knee and enlargement of the abdomen had disappeared, and his usual good health was restored.

### TUBERCULA OF THE NECK AND MESENTERY.

Master T. I., of the city of Cincinnati, aged 18 months. I was called to see him about September 1st, 1830. He had scrofulous ulcers under each ear, which were discharging scrofulous matter very freely, and a number of tubercles of different sizes, on both sides of the neck, and an enlargement of the abdomen, with diarrhœa. It was now more than a year since the disease commenced, and he had irregular fever and was feeble and emaciated. Five or six physicians had attended and prescribed for him, but the disease grew worse. Prescribed the magnetic pills and plaster. His health began to improve in a few days, and in about six weeks the ulcers were healed and the tubercles had disappeared, and his health was in all respects restored.

### TUBERCULA OF THE LEFT HIP AND FOOT.

*After amputation for tuburcula of right knee.*

Mr. J. S., of Preble county, Ohio, of light complexion, aged 19 years, called on me, September 19th, 1836. His right thigh was amputated about five years ago, on account of white swelling of the right knee, soon after which he began to feel pain, sometimes in the left hip, and at others in the knee, and these pains continued, with varying severity, until about

ten months ago, when his foot began to swell and to be painful. The pain in the hip and knee then subsided. The white swelling is now large, and extends over the foot, and sides of the foot, and he has tubercles on both sides of his neck, and his health has continued feeble since the amputation. *Diagnosis.* Chronic tubercula of the hip joint and foot.

Prescribed, magnetic pills and plaster. *October 7th*, the whole swelling is gone, excepting only a small abscess, which, on being opened, discharged two teaspoons full of tuberculous matter. The plaster was now re-applied, and the pills continued, and in three weeks the abscess was healed and his health restored.

### ACUTE TUBERCULA OF THE LEFT LEG.

Master W. L., of Somers, Preble county, Ohio, aged five years; called to see him October 11th, 1834. He had a violent and spasmodic pain in the lower and forepart of the left leg, with intervals of ease. The disease commenced five or six days before, and, on examining his neck, I found five or six large tubercles on the left side. A physician had been every day in attendance, and had prescribed the usual antiphlogistic remedies, including a blister over the swelling; but the pain continued with unabated violence, and the patient, in his agony, continued to make the welkin wring with screams.

*Diagnosis.* Acute tubercula. I now took a scalpel, and laid the swelling open along the course of the tibia, about an inch and a half through the blister, integuments and periosteum to the bone.

This operation, though a severe one, was less painful than one of those turns of severe pain. I now placed a linen cloth over it, and directed it to be wetted in a triple solution of sulphate of copper, iron, and alumine, in the following proportions, viz., blue vitriol one-fourth of an ounce, copperas and alum, each half an ounce, water one pint, and also to wet a roller bandage in this solution, and commence at the toes, and roll it moderately tight over the foot, ankle, and leg to the knee, and at night to remove it and apply a fermenting poultice over the limb; and in the morning to apply again the cloth, wash, and bandage, and to continue this course until the pain ceased, and then to discontinue the wash and poultice, and apply magnetic scrofulous plaster, with the roller bandage. I also prescribed magnetic pills; one to be taken night and morning for one week, and afterwards one every night.

The turns of spasmodic pain now gradually decreased in frequency and violence, and in nine days he was able to walk about the house, and in less than two weeks after this his leg was healed, and his health restored.

*Disease of the Hip Joint.*

Master J. C., aged 14 years, called to see him November 20th, 1828. He had been complaining of pain in his right knee, with a little lameness every two or three days, during the last two weeks, but is now confined to his bed, with pain in his right hip He lays on his left side, with his thighs drawn up, and every attempt to move the limb produces pain in the hip, and he cannot bear pressure on the joint or in the groin. On comparing this joint with the left, there was no swelling or enlargement, but, on the contrary, it appears rather less or flattened on the out side of the joint, and the limb appears shorter than the other. He has some fever; is very irritable, and has tubercles on the right side of the neck and in the groin.

Prescribed, magnetic pills, and a large poultice to the hip and groin, to be renewed once in four hours. *November* 21. Pain abated, discontinued the poultice, and applied magnetic plaster over the hip and groin.

*November* 23. Pain in the joint much less, and he rests better during the night. On removing the plaster, the hip and groin were covered with small vesicles and ulcerations. The same plaster was spread again, by adding a little more to it, and re-applied.

*November* 26. He continues better, but the joint is in every attempt to move it still very painful. The same course was continued, and in four weeks he was able to sit up, and in two weeks more, was able to walk with a little lameness, from which he entirely recovered in a few days, and without any shortening of the limb.

There are a few cases in which I use other external applications instead of the plaster, as will be seen by the two following examples.

TUBERCULA OF THE HEEL.

*Acute White Swelling of the Heel and Ankle Joint, with Abcesses and Caries of the Bones.*

Miss M. G——, of Springfield, Hamilton county, Ohio, aged twelve years. I was called to see her, February 5th, 1833. She had been attacked with acute white swelling of the left heel, three months previous to this time. The whole foot and ankle was now swollen as large as the skin would admit, and was œdematous, and extended half way to the knee. There were three abscesses on the right side of the heel, five on the left, and two on each side of the ankle joint, all discharging sero-

fulous matter, of a greenish-yellow color, and the whole foot and ankle had a dusky yellow appearance. There was little or no sensibility in the skin, but a great discharge of matter, with acute pain on pressure. On introducing the probe into the abscesses, the bone was found bare in three of them on the left side of the heel and foot, and had a rough feel. She had a number of tubercles of different sizes, from that of a pea to a walnut, on both sides of her neck, and was now, and had been from the first, confined to her bed, and is now very feeble and emaciated, has hectic fever, and has suffered much from pain in the heel and ankle. About three weeks previous to this time, the attending physician proposed to amputate the limb, (as is customary in such cases) as it offered, in his opinion, the only chance to save her life. Her parents, opposed to this last resort, sent for a celebrated physician of a neighboring town in consultation, who was of the opinion that she would not recover, whether the limb was amputated or not.

Prescribed, magnetic pills and a wash for the limb, composed of sulphate of copper (blue vitriol) a quarter of an ounce, sulphate ferri (copperas) one ounce, sulphate of alumine (alum) one ounce, dissolved in a pint of warm water. A roller bandage to be wet in this solution and applied to the foot, ankle and leg, and to be kept wet with the wash through the day, and at night to remove the roller and apply the common fermenting poultice through the night alternately. *February 15th.* The swelling of the limb has lessened more than one-half. The cuticle (scarf skin) very much thickened, has peeled off of the entire foot, and it has a much more healthy and natural appearance. Her fever has nearly disappeared, and her health much improved, and she is able to sit up. Her health continued to improve without any interruption, with the same treatment, and in two weeks more the swelling had disappeared from the foot and leg, except at the heel, and in another week the abscesses on both sides of the ankle joint, and on the right side of the heel, were healed. The magnetic plaster was now applied to the left side of the heel. She was able to walk soon after this, first on crutches, and then without them. More than a dozen pieces of bone came out of the left side of the heel and foot, two of them large and of the circumference of a quarter of a dollar. Her father and mother are both scrofulous.

### TUBERCULA OF THE UTERUS AND RIGHT LEG.

Mrs. H., of Union, Butler county, Ohio, of the middling size, and good constitution, aged 46 years.

Called to see her August 17th, 1833. She has a large fungus ulcer on the right side of her right ankle. The foot and leg swelled as large

as the skin will admit, which has a shining appearance, and the ulcer black and depressed from the surrounding everted edges of the skin. It is in form perfectly round, and as large as the circumference of the top of a large tea cup, and is to the depth of half an inch, a gangrenous mass of fungi, which emits a horrible smell. The swelling commenced about three months since.

Her countenance is pale and sallow, and she has leucorrhœa, with which she has been affected more than two years, and she is now feeble and emaciated,—is suffering severely with dull and lancinating pains in the ankle and leg, and is confined to her bed.

She has a number of tubercles on the right side of her neck, and pressure on two of the lumbar vertebræ produces pain, which darts into the uterus. Prescribed the magnetic pills and a grain of quinine, three times a day, with a large fermenting poultice to the foot, ankle and leg, to be renewed morning and evening, and the magnetic plaster over the lumbar vertebræ. *August 22nd.* The swelling of the limb is very much reduced, and the gangrenous fungi have sloughed out and left a large and round chasm half an inch deep, the bottom of which is covered with fungus or round elevations, of a red colour, surrounded with a white colored matter, and the edges of the skin every where everted, and besides this formidable ulcer, the whole of the back part of the ankle, from an inch above the bottom of the heel to four inches above the ankle, is now one mass of fungus or loose and spungy ulcers, the skin having entirely disappeared.

The limb was now washed with a solution of chloride of mercury, and adhesive plaster, spread very thin on strips of cotton cloth, two and a half inches wide, and long enough to reach round the limb and lap over two inches, and a sufficient number of them so spread to cover the limb from the lower part of the ankle to a point seven inches above it. I commenced applying these strips by making one end stick fast to the side of the heel, and then drew it round below the ankle moderately tight, and then took up another and fastened it as before, and lapped it on the first about an inch, and drew it on, and let it lap over the end of the strip as before, and so with the remainder of the strips, until they were all on.

I then took a roller bandage, wet in the above solution, and commencing at the toes, rolled it over the foot, ankle and leg, to the knee. Directions were now given to keep the roller wet with the solution, and remove it and the strips of plaster, and wash the leg and ulcers, and re-apply new strips of plaster, and the roller, in the same way night and morning, and in case the limb should become more painful, to remove them, and apply the fermenting poultice for twelve hours, and then again apply the wash, strips of plaster, and roller.

*September* 8*th*. The swelling of the limb has subsided, except a little about the ulcers, and they have commenced healing from their extreme points towards the centre Her health has improved so much as to be able to sit up the most of the day, and the quinine discontinued.

*October* 3d. Her leucorrhœa has disappeared, and the ulcerations reduced to about one-third their original dimensions. The same course of treatment was continued with little variation, and in about two months they healed entirely, when her health was fully re-established.

The manner of applying adhesive strips of plaster pursued in this case was first recommended by Cooper, in cases of the common ulcerated legs, and it cured some cases, but the disease generally returned again after a few weeks or months. When, however, the disease is treated like this case, with the magnetic pills and the adhesive strips of plaster, the diathesis or taint in the system from absorption from these ulcers is destroyed, and the disease does not return. The adhesive plaster I use in these cases is much better and cheaper than that obtained from the shops, and is made by boiling rosin and lard in water an hour, in the proportion of one ounce of lard to every pound of rosin, and when nearly cold may be made into rolls of any convenient size. The rosin must always be good and free from impurities. The plaster must also be spread very thin and very even, and always applied precisely in the same way as in this case, when it cures the disease, if it is not of more than seven or eight years' continuance, in from five to seven weeks.

### COLOUR OF THE SKIN IN CHRONIC TUBERCULA.

In the foregoing cases of chronic tubercula of the limbs, neck, head, and face, there was little or no discolouration of the skin, and there is little or none of the membranes which cover the tuberculated organs. There are, however rare cases of this disease in which a red colour of the skin is sometimes produced by accidental causes, and in order to prevent these cases which are incurable by other remedies, from being mistaken for another disease, the following case is presented.

Miss M. G., aged ten years, was brought to me January 26th, 1836. The lower half of her nose is swelled and of a scarlet red colour. The lower half of both cheeks, upper and under lip, and chin, are also swelled, and of the same scarlet colour, and they all have a smooth and shining appearance, except in some places along the cheeks where they are tuberculated, and along the upper lip where tubercles have ulcerated and are discharging matter.

The disease commenced about five years since with pain, and then a thin or sanious discharge from the nose, which from its frequent application to the skin produced the swelling, ulceration, and scarlet colour of this part of the nose and face.

She has a black and very intelligent eye, and is apparently a perfect beauty, saving the frightful deformity produced by this disease, from which she has suffered long, and sometimes severely.

The line or ganglia of glands on both sides of her neck, with the submaxillaries under the jaws and the parotids are tuberculated. The tubercles very large, and painful under pressure.

Pressure on a small tubercle of the right side of the first cervical vertebræ produces pain, which darts into those under the jaw, and into the throat of the right side and into the nose. Pressure on one of the left side of the same vertebræ produces pain which darts into those under the jaw and into the throat and face of the left side. I now examined the mouth and found both tonsils tuberculated, and the tongue one-third larger than natural. A number of physicians have as usual attended and prescribed for this patient. *Diagnosis.* Tubercula of the nose, face, tonsils and tongue. Prescribed magnetic pills and plaster.

The disease began to subside in a few days, and at the end of ten weeks it had entirely disappeared, and the colour of the skin natural. One plaster was applied in this case over the first cervical vertebræ. One over the lower part of the lower jaw and upper part of the neck of both sides, and one over the swelled and scarlet portions of the face. She wore the plaster on the face four or five weeks only, and on the neck seven or eight.

# APPENDIX.

## A

I ADD to the common per chloride of gold a quantity of condensed chlorine, which is supposed to be equal to ten or twelve times the quantity condensed in the common per chloride, and which greatly increases its contractive power in the same doses. It is supposed to be the same article which was used by the ancient Egyptians; the knowledge of which, in some form, has descended to the modern Arabians and Persians

## B

The Bitumen and principal article of which the plaster is composed, is the same article which was used by the ancient Egyptians, and other ancient nations, for the same purposes, and also for embalming, and from which the Germans but recently commenced the manufacture of creosote. The skin over which the plaster is applied, absorbs the creosote from it, and at the same time excretes a mucous or positive matter, instead of its natural excretion of æriform, aqueous, or negative matter.

## C

" The remains of animals and vegetables in the rocks and earthy strata of the earth, are the true and only means of ascertaining its history and natural changes before the records of man. The discoveries made on this subject within the last half century form an era in science in which the name of Cuvier will always be distinguished. In all

countries, on digging to certain depths, and in mining, the remains of fishes, vegetables, quadrupeds, and birds are found in the soil or imbedded in the rocks, except in those of primitive antiquity. The general regularity with which those that are marine are laid at one level, and those which are products of land are laid at another, and the alternations of these marine and land products, lead to the conclusion that the sea has repeatedly covered the land for long periods of time, and that the land has, at intermediate periods, been dry; and what is very remarkable, the remains found consist, and always at certain depths, of species of animals, vegetables, &c. not now in existence, and often of genera not natural to the present climate. Cuvier has enumerated several hundred genera of animals, fishes, and vegetables so found, of which there are none of the living genera or species. The lowest rocks, it is therefore inferred, were at one time the surface of the earth and the seat of organic life. These appear to have been destroyed by some great revolutions which brought new tribes of organized beings, while their kinds prove that the surface was covered with water. The subsequent appearance of amphibia, &c. prove the development of dry land; these appear to have been swept away, and among later solid rocks, the monstrous race of herbiverous quadrupeds and gigantic lacerta came into existence when the earth seems to have acquired herbage for their subsistence. How long this race kept possession cannot be guessed, but their length of life is well known. The gypsum, &c. which now contains their remains is covered with newer deposits, abounding with sea shells, and above the stratum is found a new race of herbiverous animals of the genera of the elephant, rhinoceros, &c. and above them is the first loose soil, intermixed with marine substances, proving second or third immersions of the sea; and above this lies the soil which the present race of animals enjoy. What may follow, and when, and how, is a curious question.

"The age of the rocks indicates the age of the remains, but we can measure neither by any comparison with known time.

"The older secondary rocks contain peculiar aquatic plants and reeds, then above these madrepores, coral, &c. all fixed where they lived; and then shell-fish, very simple, but differing from all now in existence; in strata above these fishes, bamboos and ferns; in a still higher stratum are more complicate shells and oviparous amphibia, as crocodiles, tortoises, and reptiles; these are imbedded in the uppermost solid rocks of the oldest secondery formation.

"In the newest solid rock formations, whales, seals, and birds appear; above these land animals of enormous size, birds and fresh water shells, all in concrete rocks.

"Above these, in the lowest beds of loose soil and peat bogs, elephants, elks, rhinoceroses, of peculiar species are found. Near the surface is found the remains of the existing races. Human bones have only been found among these.

"The fossil or organic remains in strata are always the same kind in similar strata, and generally have characters of simplicity of structure, proportioned to the age or depth of the stratum.

"Brogniart, in his Geological Flora, classes plants into four periods: 1, The transition and coal formation; 2, Variegated sandstone; 3, The chalk; and 4, Above the chalk. He conceives that the successive creations are distinguished by a sudden change in the essential characteristics. Those of the fourth period are similar to the present. Below the chalk the most perfect are the *cycadeæ* and *conifera.* A land vegetation marks each period, while one family of one period runs into another. The dicotyledonons begin in the oldest strata of the secondary formations, and increase in the more recent."—*Treasury of Knowledge.*

As vegetative and animal life are most vigorous and luxuriant in the middle of the golden ages, when the average heat of the earth and the perfection of all things are at their maximum ; there can be no doubt but man, with the long list of other animals belonging to the order mammalia as well as that of the amphibia, were successively produced in those periods ; many species of which were subsequently overwhelmed by the raging elements, and became extinct in other ages. These creations were at first of comparatively small size and of simple form and structure, which were succeeded by those of greater size and more complicated and perfect forms in each succeeding period until they at last arrived at their maximum in the production of man, the mastidon and the missourian.

These great geological revolutions in the surface of the earth were performed in four periods of time, and the length of each of these periods was 2,304,000 years ; making in the whole 9,216,000. The earth had existed two periods previous to the commencement of these revolutions, in the first of which, the primitive crystallised granite was deposited, and formed the crust on which the first strata were laid in the second period, devoid of organic remains. These periods amounted to 4,608,000 years, and when added to the four periods above described, make in the whole 13,824,000 years from the commencement of the first to the completion of the sixth period.

We are now progressing in the seventh period, and assuming that it will be completed in the middle of the present age, or when the earth's axis is again perpendicular to the plane of the ecliptic, then it is 2,161,845 years since the commencement of this period, and of the decay of the earth, and of all things upon it.

## D

The brain is frequently tuberculated, as is shown by the magnetic symptoms and by post mortem examinations. I have also found these symptoms in every case of Hemiplegia or paralysis of one side, which I have examined during the last twenty years. I have also found them in every case of Epilepsy, Chorea, and Amaurosis. These are, therefore, cases of tubercular disease, and they are uniformly cured by the magnetic remedies, in the first stage of the disease, in young subjects ; but in old subjects, where the brain has been a long time tuberculated, as is usual in such cases, these remedies have generally little or no effect, except to palliate the symptoms.

These symptoms are also found in Paraplegia or tubercular disease, affecting the spinal cord, which are generally cured by these remedies, in the first stage of the disease, in young subjects.

It will be observed that I have regarded tubercles in the lungs and brain, as well as those found in other organs, as the diseased satellites of the lymphatic glands, and it is believed they must be so regarded hereafter by physiologists ; for the magnetic symptoms demonstrate their direct connection with the lymphatic glands. They cannot, therefore, (according to the received opinion,) be foreign bodies.

## E

I called to see Miss E. B. about the 15th June 1841, and found her enjoying fine health. She has grown about a head taller than she was when I saw her last in April 1840. Her form continues perfect, and she walks more erect than ladies generally do.

Lateral curvatures of the spine are produced by the contractions of tuberculated muscles. In this case, like every other, the muscles were thickened on the side of the spine to which the curve was directed. When these tuberculations are reduced, the spine resumes its natural position. In the case of Mrs. P., page 133, the muscles were tuberculated on both sides of the same vertebræ, from the sixth dorsal to the third lumber, yet there was no curvature of the spine, because the force of the contraction on one side was balanced by that on the other

The contractions of the muscles on one side of the vertebræ only, produced partial dislocation, and a greater or lesser curvature in proportion to the extent and intensity of the disease in the muscles. Partial dislocations of the joints of the limbs are frequently produced in the same manner. In a great majority of the cases of disease of the hip joint, there is partial dislocation of the head of the femur soon after the disease commences, by the contraction of the large tuberculated muscles of the outer and back side of the joint.

M. Guerin of Paris has recently introduced the practice of dividing the contracted muscles to reduce these partial dislocations, and is pursuing it with great success. It must greatly facilitate the cure of the disease in these cases, while the operation alone cures entirely congenital affections of this kind, as wry-neck, club-foot, &c. &.

# GLOSSARY.

## A

*Ablation*, Taking away, abstracting, or cutting off.
*Abnormal*, Irregular, unnatural, singular, misshaped.
*Absorption*, The act of sucking up, attracting, or collecting, as with a sponge.
*Absorbents*, Vessels taking up and conveying fluids.
*Abscess*, A collection of pus in a cavity, the result of morbid process.
*Accessorious*, Helping, additional, two nerves running from the medulla oblongata.
*Acetate of Lead*, a combination of acetic acid, or vinegar, with lead.
*Acini*, Minute kernels, tubercula, or glandiform corpuscles.
*Acoustic Nerve*, Belonging to the ear, hearing, or sound.
*Adipose*, Fatty, containing fat.
*Alkaline*, Having the quality of an alkali, or fixed salt, caustic.
*Amenhorrhœa*, Suppression of the menses.
*Anastomatic*, Quality of removing obstruction, deobstruent.
*Anaphrodisia*, Absence of venery, impotence, sterility.
*Anastimose*, To join two vessels, union of parts or currents.
*Aneurism*, A tumor, formed by the dilatation or lesion of an artery.
*Anfractuosities*, Sinous depressions, windings or turnings.
*Angina*, Quincy, or sore throat.
*Antiphlogistic*, Opposed to inflammation—depleting.
*Antrum*, Cavities in bones, the entrance to which is smaller than the bottom.
*Aorta*, The great artery arising out of the left ventricle of the heart.
*Arachnoid*, Inner membrane covering the brain.
*Asphyxia*, Suspended animation or motions of the heart, swooning or fainting.
*Asthenic*, Relating to a debility of the vital forces.
*Ataxic*, Pertaining to disorders characterizing nervous fevers.
*Atony*, Want of tone or force, general debility.
*Auriferous*, Producing or partaking of gold.
*Auscultation*, To listen, to learn by sounds through the stethescope, or otherwise, the diagnosis of diseases in the heart and lungs.
*Automatic*, Mechanical, like or belonging to an automaton.
*Axillary*, Belonging to the armpit.

## B

*Bronchia*, The tubes arising from the throat, or trachæa, and conveying air into the lungs.

*Bronchitis*, Inflammation of the lining membrane of the bronchial tubes.

*Bronchophony*, Guteral sound of words in the lungs, like that in the character of Punch.

## C

*Calamus Scriptorius*, A furrow or canal in the fourth ventricle of the brain.

*Calx*, Lime, preparations of lime used medicinally.

*Cardiac*, Relating to the heart or upper orifice of the stomach.

*Carnivorous*, Feeding or living on flesh.

*Caries*, Ulcerations of the bones.

*Catarrhal*, Relating to a discharge from a mucous membrane.

*Catamenia*, The menses.

*Catenation*, A link, a regular connection.

*Catholicons*, General remedies, panaceas.

*Catheter*, A tube or instrument, introduced through the urinary passage into the bladder.

*Cautery*, A burning iron, a caustic.

*Cellular*, Consisting of cells or cavities.

*Cellulosity*, State of having cells.

*Cerebellec*, Belonging to the cerebellum.

*Cerebelli*, The two hemispheres of the cerebellum.

*Cerebellum*, The small brain, posterior to the cerebrum.

*Cerebral*, Belonging to the brain.

*Cerebrum*, The brain anterior to the cerebellum.

*Cervical*, Belonging to the neck.

*Chlorosis*, A disease affecting females before menstruation.

*Chloride of Mercury*, A compound, formed by chlorine and mercury.

*Chorea*, St. Vitus' dance.

*Chronic Diseases*, Those of long duration, organic, impeding performance of functions.

*Chyle*, A white fluid produced by digestion, secreted from the stomach.

*Cincritious*, Color of ashes, the part of the brain, &c. of that color.

*Circulatory System*, Circulation of the blood and other fluids of the body.

*Circumflexus Palati*, A muscle of the sphenoid bone.

*Clavicle*, The collar bone.

*Clinical*, Relating to discourse or practice at the bed of the sick.

*Commissure*, A joint of union, seam or bridge.

*Comparative Physiology*, Knowledge or doctrine of functions, derived from study of the lower order of animals.

*Coma*, Morbid disposition to sleep, profound sleep, lethargy.

*Condyloid*, Shape of a condyle, or soft protuberant end of a bone.

*Congestion*, An unnatural accumulation of blood or other fluid in an organ.

*Conglobate*, Formed into balls—lymphatic glands.

*Conjunctiva*, External coat of the eye.
*Contractility*, Power, or susceptibility of contraction, or shrinking.
*Contractile*, A muscle, having the power of contracting or shortening.
*Convolutions*, Turnings, undulating, or tortuous projections, as of the brain, intestines, &c.
*Corpora Restiformia*, Resting bodies, medullary projections from the top of the medulla oblongata.
*Corpora Striata*, Two ganglions in the ventricles of the brain.
*Coronary*, Belonging to the crown or top, as of the head.
*Costal*, Relating to the ribs.
*Corpus Olivare*, Olivary body or ganglion in the medulla oblongata.
*Cortical*, The exterior skin, rind, bark.
*Costive*, Bound, retentive, close.
*Cranium*, The skull.
*Crepitous*, Pertaining to crackling sounds in breathing, ebulitions of air, or the frictions of bones.
*Cribriform*, Resembling a sieve or riddle, like the ethmoid bone.
*Crura*, Bodies resembling legs or roots, as the crura cerebri.
*Crypts*, (*Cryptæ*, pl.) Follicles, cavities, small glands, or cells in the membranes.
*Cystis*, A bag, the urinary bladder.

## D

*Decussation*, Crossing, intersection at angles, &c.
*Degeneresccnce*, A change for the worse in the composition of fluids, or solids of the body, or the structure of an organ.
*Diagnosis*, Discrimination of diseases—"What is the matter?"
*Diaphragm*, The midriff, a muscular partition dividing the chest from the belly.
*Diarrhœa*, A flux, purging.
*Diathesis*, Disposition, predisposition to certain diseases.
*Dorsal*, Belonging to the back, the second division of the spine, consisting of twelve vertebræ.
*Dorsal Medulla*, marrow of the dorsal vertebræ.
*Duct*, A tube, canal, or passage for fluids.
*Duodcnum*, First small intestine receiving the food from the stomach
*Dyspnœa*, Difficulty of breathing.

## E

*Electro-dynamic*, Laws relating to electrical forces, &c.
*Elixirs*, Liquid extracts, the essence, a medical cordial.
*Ellipticity*, Oval, like an egg.
*Embryo*, A germ, elementary organization, fœtus, first or unfinished form.
*Encephalic*, Belonging to the head or the brain.
*Erotic*, Loving, produced by love.
*Ethmoid Bone*, Lying horizontally with the eyes and over the nose.
*Exacerbation*, Increase in the symptoms of disease.
*Excrete*, To separate, to throw off.
*Expectoration*, The act of expelling secretions from the chest—the matter expelled.
*Extravasated*, Forced out of the proper vessel or channel, as with stagnant blood.

## F

*Fascia*, A membrane, covering the muscles.
*Femoral*, Relating or belonging to the thigh.
*Fibrillæ*, Small fibres.
*Flexor and Extensor* muscles, The offices of which are to extend and contract.
*Flocculi*, Flakes, like snow, leaf-like.
*Fœtal*, Relating to the fœtus, or child in the womb.
*Follicles*, Little glands, bags, or folds.
*Foramen*, (*Foramina*, pl.) A hole or opening.
*Foramen Magnum*, A large hole or opening at the base of the brain, through which the spinal marrow enters the brain.
*Foramen Lacerum*, A hole in the *os phenoides*.
*Formulæ*, Forms of medicinal preparations or prescriptions.
*Fornix*, A medullary body in the brain.
*Fossa*, (*Fossæ*, pl.) A groove or ditch.
*Frontal*, Belonging to the front, or forehead.
*Fungus*, (*Fungi*, pl.) A spungy excrescence.

## G

*Ganglions*, Organs formed of agglomerated globules in the brain—the posterior spinal nerves and along the course of the sympathetic nerves.
*Gangrenous*, Mortification, partial death, or disorganization of any organ or limb.
*Gestation*, The act or period of carrying young.
*Gibbosity*, Curvature of the spine—relating to rickets and caries of the vertebræ.
*Glands*, Organized bodies, situated internally and externally, to secrete fluids or modify those of others.
*Glandular*, Of the form or texture of glands.
*Globate*, Like a globe.
*Glottis*, The opening of the windpipe or larynx—serving in the formation of the voice.
*Glossopharyngeal*, Belonging to the tongue and pharynx.

## H

*Hectic*, Fever, preternatural irritability, febrile excitement, with emaciation.
*Hemiplegia*, Paralysis of a part or one side of the body.
*Hemorrhage*, A violent or unnatural flux of blood.
*Hæmoptysis*, Hemorrhage from the lungs.
*Homogeneous*, Of the same nature—similarity of parts.
*Hydriodates*, Salts consisting of the hydriodic acid combined with an oxide.
*Hydrocephalic*, Relating to dropsy, or water on the brain.
*Hyoideal*, Relating to the os hyoides.
*Hypertrophy*, The state of a part in which nutrition is performed, with great or unnatural activity.

*Inervation*, Weakness—relaxation of the nervous power.
*Increments*, Increases, additions, or productions.
*Inosculate*, Inter-union of the extremities of arteries, veins, &c.—to unite by contact
*Infinitesimal*, Indefinitely small quantity.
*Intercerebral*, Between the hemispheres, or parts of the brain.
*Intercostal*, Between the ribs.
*Integument*, The skin, an envelope, bark, a covering.
*Intermembranous*, Between the membranes.
*Inguinal*, Relating or belonging to the groin.
*Involuntary Muscles*, Those performing their functions without the aid of the will.
*Iodine*, A violet colored liquid, obtained by burning a marine plant and the ashes with sulphuric acid.
*Iris*, The variegated circle surrounding the pupil of the eye.

## L

*Laminæ*, Thin plates or layers.
*Laryngeal*, Relating to the larynx.
*Larynx*, Upper part of the trachea or windpipe.
*Leucorrhœa*, A colored discharge from the membranes of the uterus, &c.
*Leyden Jar*, A glass vessel, covered with tin foil, for electrical purposes.
*Ligamenta dentata*, A small ligament supporting the spinal marrow.
*Ligament*, An elastic and strong membrane, connecting moveable bones, &c.
*Lobes*, Round projecting parts or divisions of organs—as of the brain, lungs, &c.
*Locus Niger*, Dark colored cells or spots.
*Longus Colli*, A flexor muscle of the neck.
*Lumbar*, Relating to the loins—five vertebrae of the third division of the spine.
*Lymph*, A clear fluid, found in the lymphatic vessels, mixing with the chyle and blood.
*Lymphatic Tubes*, Small vessels of the body, containing or carrying lymph.

## M

*Maison de Sante*, Sacred house, a hospital.
*Mammalia*, Animals which suckle their young.
*Mammary*, Pertaining to the breasts.
*Manipulator*, One practising by manual operations.
*Marasmus*, Consumption—destroying, a wasting disease.
*Masseter*, A strong muscle, closing the jaw in chewing.
*Matity*, Relating to sounds, afforded by the percussion of the chest.
*Maxillary*, Pertaining to the jaw bones.
*Maximum and Minimum*, The greatest and least—indicating the greatest and least number, quantity, or power in any case.
*Median*, The middle line.

*Mediastinum*, The fold of the membrane separating the chest into two parts.
*Medulla*, The marrow.
*Medulla Oblongata*, The union of the parts of the brain to form the spinal marrow.
*Medulla Spinalis*, The spinal marrow.
*Membrane*, A thin, expanded substance, composed of elastic fibres, interwoven like network, covering and lining the organs of the body.
*Menorrhagia*, Excessive flow of the menses, or monthly hemorrhage.
*Mercury*, Quicksilver—a preparation of mercury by volatilization.
*Messenteric*, Relating to the messentary.
*Messentary*, A double fold of the membrane lining the abdomen and covering the intestines.
*Meterologico-Medical*, Diseases depending on the atmosphere or the weather.
*Microscopic*, Seen only by the microscope—an instrument for magnifying minute objects.
*Molecular*, Small, diminutive, elementary parts.
*Motor*, Moving, prompting, or acting.
"*Mouvements d'ensemble*," Combined movements.
*Moxa*, An application of cotton, wool, or other substance, which is burned on the part intended to be cauterized.
*Muco-serous*, Partaking of the quality of mucus and serum, or of the mucous and serous membranes.
*Mucous*, Of the nature of mucus.
*Mucous rale*, Rattle, or sounds produced by the air in breathing, passing through mucus.
*Mucus*, A mucilage, a glutinous, thready semi-transparent fluid of a salt savor, produced in the mucous membranes.
*Muriate*, A salt formed by the combination of muriatic acid and a base, as soda, or any of the earths or metals.
*Muscles*, Regular structure of fleshy bodies, composed of fibres, and adapted to distinct functions in all the varied motions of life.

## N

*Naso palatine*, Relating to the nose and palate.
*Nephrolgia*, Pain or disease in the kidneys—belonging to the kidneys.
*Nerves*, Cords composed of filaments, conveying sensation, motion and will to and from the brain.
*Nervous filament*, A thread or fibre of a nerve.
*Nitrate*, A salt formed of nitric acid and an earth or a metal.
*Normal*, Natural, by rule, upright.
*Nosologists*, Those skilled in the classification of diseases.
*Nurilema*, The investing sheath of the nerves.
*Nutation*, Tremulous motion of the earth's axis.
*Nux vomica*, The vomic nut of India.

## O

*Œdematous*, Relating to a swelling from a serous fluid in the cellular texture.
*Olfactory*, Belonging to the organs of smell—sense of smelling.
*Olivary*, Belonging to the two prominences on the medulla oblongata.

*Ophthalmic*, Relating to the eye.
*Os coxyx*, The lowest bone of the sacrum.
*Os sacrum*, The fundamental bone of the spinal column; of pyramidal form, base upward.
*Os hyoides*, The bone forming the base and support of the tongue.
*Oxyde*, A rust or substance, formed by the combination of oxygen and a metal.

## P

*Panacea*, Universal remedy for human diseases.
*Pancreas*, A large gland, secreting a kind of saliva and pouring it into the duodenum—the sweet bread.
*Papillary*, Having emulgent vessels, or resemblances of paps.
*Par vagum*, Eighth pair of nerves.
*Paralysis*, Palsy, prostration of nervous power.
*Parietal*, The two bones of the lateral and upper parts of the skull.
*Pathology*, The part of medicine relating to diseases, their causes, effects, and peculiarities.
*Patulous*, Of the form of lips, or an extended flower.
*Peripheral*, Of a round form—relating to the circumference.
*Peritoneum*, A serous membrane lining the abdominal cavity.
*Pericardium*, A membranous sack envelopeing the heart.
*Periosteum*, A white fibrous membrane surrounding the bones.
*Pharmacopiæ*, Medical dispensatory, formulæ of compounding medicines, the rules or book of pharmacy.
*Photographic*, The art of producing impressions on metallic plates by the sun's rays.
*Phrenic*, Relating to the mind.
*Phrenologists*, Students and advocates of the physiology of the brain and nervous system, as propounded by Gall, Spurzheim, and others, and on which is now based a clear and beautiful system of mental philosophy.
*Physiology*, The science of organic life, the natural constitution and functions of organs, animal and vegetable.
*Pia mater*, A thin membrane immediately investing the brain.
*Platina*, A greyish white metal, heavier and more durable than gold.
*Plexuses*, Junctions of vessels, nerves or fibres, representing net work.
*Pleum*, Fulness, fleshy, large.
*Pneumatica*, Pertaining to breathing.
*Potassa*, Potash—a vegetable alkali.
*Premier mobile*, First cause, principal or impulse.
*Premier moteur*, First motive, or impulse to action.
*Prolapsis uteri*, A falling down of the uterus.
*Psoas*, Two muscles situated on the lumbar and dorsal vertebræ.
*Pterygoids*, Two processes, or wings of the sphenoid bone.
*Pyramidal*, Of the form of a pyramid.
*Pulmonary catarrh*, Inflammation of the membrane lining the inside of the air tubes of the lungs.
*Purulent*, Matter—pus.

## Q

*Quinine*, An alkaline substance, obtained from the cinchonas, valuable bitter barks from South America

## R

*Rachitis*, Curvature of the spine—the rickets.
*Rectilinear*, Straight, in straight lines.
*Rectus externus*, Muscle attached to the foramen opticum and the sphenoid bone.
*Remollissement*, Branching like boughs—small sprigs.
*Renal*, Relating to the kidneys.
*Restiform columns*, Parts of the brain.
*Retina*, A delicate and sensitive nervous membrane (considered an extension of the optic nerve,) on which the images of objects are received.
*Rodentia*. Gnawers—a class of animals which gnaw their food; as the rat, beaver, squirrel, &c.
*Ruminating*, A class of animals which chew the cud—reflecting.

## S

*Sacral*, Relating to the sacrum—a bone forming the posterior part of the pelvis.
*Salivary*, Belonging to the glands secreting saliva or spittle.
*Sanative*, Power of healing—healthful.
*Sanguineous*, Relating to or indicating a fullness of blood; tinged with blood.
*Sarsaparilla*, The name of a sudorific plant of medicinal virtue.
*Scirrhous*, Pertaining to scirrhus—a disease of the glandular structures, and known by its hardness, &c.
*Sclerotica*, A hard white membrane covering the globe of the eye.
*Scrofu'a*, A depravation of the humors of the body breaking out in sores.
*Secretion*, The process of secreting from the blood, or from one fluid to another by the glands.
*Semi'una*, A semicircular, or half moon shape.
*Semi-paraplegia*, A partial palsy of the lower half of the body with the rectum and bladder.
*Sensorum commune*, Centre of sensations—the cerebrum.
*Sensory*, The seat of sensation or of perception.
*Sequestration*, The separation of a diseased or dead part from the living.
*Serous*, Partaking of serum—exudations from serous membranes.
*Serum*, A thin and yellowish part of the blood—whey.
*Seton*, An issue or rowell.
*Spheroidal*, Having the form of an oblong or oblate body.
*Spenoid bone*, A wedged shaped bone at the base of the skull.
*Spheno-palatine*, Muscles of the palate.
*Spinal marrow*, The medullary substance of the spine.
*Spinal*, Belonging to the backbone or spine
*Splanchnic*, Relating to the diseases of the bowels, or to the three cavities of the viscera, the bowels, head and chest.

*Spleen*, The milt, one of the viscera of the body—anger, spite, melancholy.
*Spongoles*, Sponges, substances like sponges.
*Spontaniety*, Voluntariness, willingness.
*Sternum*, The breast bone.
*Stethescope*, An instrument used for determining by sound the diseases of the chest.
*Sthenic*, Excessive excitement, or excess of strength in organic actions.
*Striated*, Fibrous, channelled, radiated.
*Strumous*, Scrofulous—pertaining to *struma*, the king's evil.
*Stylo glossal*, Muscles expanding the tongue.
*Submaxillary*, Under or below the jaw bone.
*Sulcus*, Groove—as on the end of bones and other organs, and in the interstices of the brain.
*Sulphate*, A salt formed of sulphuric acid and an earth, &c.
*Supra and infra orbita*, Situated above and below the orbits of the eye.
*Syphilis*, An infectious or poisonous disease, communicated by virus and contact, as in coition.
*Sympathetic*, Relating to, depending on sympathy—the action and reaction of one part or organ on another.
*Synovial*, Pertaining to synovia—a fluid like the white of an egg, exhaled from membranes around the joints.

## T

*Tactile*, Perceptable to the touch.
*Tactual*, Relating to touch and tact.
*Tegumentary*, Belonging to the outer parts—the skin or covering.
*Tella cellulosa*, The cellular or adipose membrane
*Temporal*, Relating to the temple.
*Temperament*, The constitution, or the remarkable differences of men, arising from the peculiarities of organization, relations and constituents.
*Tetannic*, Relating to a permanent contraction of the muscles.
*Thalamus*, The place where a nerve originates—an irregular surface in the ventricles of the brain.
*Thalmi optici*, Two round bodies in the brain.
*Thoractic*, Belonging to the chest or breast.
*Thyroid*, Having the form of a shield—belonging to the larynx.
*Tibia*, Shin bone—flute or hautboy.
*Tissues*, The parts of the body which forms the organs—the anatomical elements of the body, and of its diseases.
*Tonsil*, Glands in the throat—almonds of the ear.
*Trachea*, Windpipe—composed of cartilaginous rings.
*Trigeminus*, The fifth pair of nerves.
*Trisplanchnic*, Belonging to the three orders of viscera in the three splanchnic cavities—the head, chest, and abdomen.
*Tubercular*, Relating to tubercula.
*Tubercles*, Tumors in the substance of organs.
*Tumified*, Of the form and nature of tumor or swelling.
*Tympanum*, The drum or barrel of the ear.
*Typhoid*, Relating to typhus, as typhoid or typhus fever.

## U

*Uterus*, The womb.
*Uvula*, Pap of the throat, belonging to the palate.

## V

*Vascular*, Relating to, or consisting of vessels—arterial venous or lymphatic.
*Vesicles*, Vessels, bags, or bladders.
*Ventricle*, Cavities in the brain, the lower right and left cavities of the heart.
*Vertebrated animals*, Those having a spine or skeleton.
*Vermiform*, Resembling a worm.
*Villi*, Delicate fibres on parts of the body, as on the lips, &c.
*Villous*, Pertaining to villi.
*Virus*, Poison, infectious secretion.
*Viscus*, (*Viscera*, pl.) One of the viscera.
*Vivi sectors*, Those practising dissections on living animals.
*Volition*, The *will*, the act of willing or determining by choice.
*Voluntary muscles*, Those acting from the will.

## Z

*Zoophyta*, The class of organic beings partaking of both animal and vegetable life.
*Zygomatic*, Relating to the zygoma or cheek bone.

# INDEX.